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ABSTRACT

A project was developed to improve vocational administrators' program management skills through diffusion of the cost-effectiveness analysis system which was developed at Indiana University-Bloomington. Specific objectives were (1) to summarize the cost-effectiveness analysis system, (2) to develop a conceptual framework for the system's diffusion and adoption, and (3) to conduct a statewide conference on cost-effectiveness analysis of secondary vocational programs. Based on a literature review, the educational change process was conceptualized as a problem-solving process; a research, development and diffusion process; and a social interaction process. A conceptual framework was developed for the diffusion and adoption of the cost-effectiveness analysis system. The conceptual framework for the diffusion and adoption of the cost-effectiveness analysis system will be useful in developing strategies for diffusion of the research and development products and in evaluating their impacts on educational change. In system diffusion some available methods were utilized and a statewide conference was conducted for Indiana vocational administrators. The statewide conference proved to be valuable in increasing vocational administrators' understanding of the system and in gaining support for its adoption. The conference's activities constitute the foundation of a national priority training workshop. (Author/CSS)

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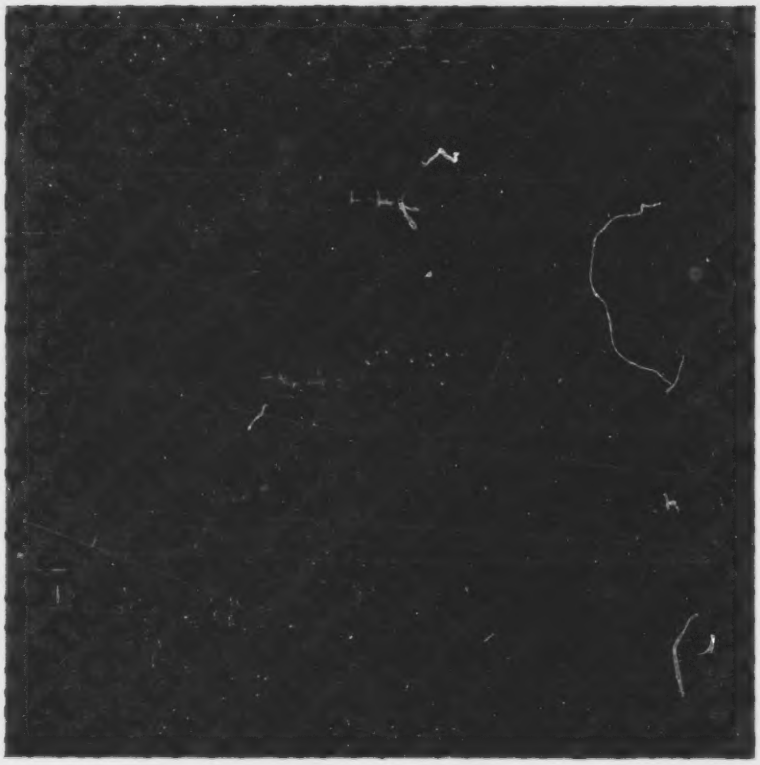
**Technical Report**

# DIFFUSION OF THE COST-EFFECTIVENESS ANALYSIS SYSTEM FOR IMPROVING SECONDARY VOCATIONAL PROGRAM MANAGEMENT:

## A CONCEPTUAL FRAMEWORK AND A STATEWIDE CONFERENCE



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## Project Information

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## Abstract

Purpose. The purpose of this project is to improve vocational administrators' program management skills through the diffusion of the cost-effectiveness analysis system which has been previously developed at Indiana University-Bloomington. The specific objectives of this project are: (1) to summarize the cost-effectiveness analysis system, (2) to develop a conceptual framework for the diffusion and adoption of the system, and (3) to conduct a statewide conference on cost-effectiveness analysis of secondary vocational programs.

Procedures. Based upon the reviewed literature, the process of educational change is conceptualized as (1) a problem-solving or self-renewal process, (2) a research, development and diffusion (RDD) process, and (3) a social interaction or linkage process. In an attempt at a comprehensive approach, a conceptual framework was developed for the diffusion and adoption of the cost-effectiveness analysis system. In diffusing the system, some available methods were utilized, and a statewide conference was conducted for vocational administrators in the state of Indiana. The project advisory committee provided appropriate suggestions and advice in planning and conducting the conference and reviewed the products from the project.

Products and Results. The conceptual framework for the diffusion and adoption of the cost-effectiveness analysis system will be useful both in developing strategies for diffusing the R & D products and in evaluating their impacts on educational change. The statewide conference proved to be valuable in increasing vocational administrators' understanding of the system and in gaining their support for its adoption. The conference's activities constitute the foundation of a national priority training workshop.

In conjunction with this project, the cost-effectiveness analysis system has now been disseminated nationwide by means of the ERIC system, through relevant publications, and through the presentations of papers. The system has received recognition from educational professionals and practitioners.

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J.E.K.

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# Chapter I

## INTRODUCTION

This report presents a conceptual framework for diffusing a cost-effectiveness analysis system which was developed at Indiana University-Bloomington and describes a statewide conference convened to acquaint vocational administrators with the system. The project was conducted with the financial support of the State Board of Vocational and Technical Education. A description of the problem to be examined, the objectives, the procedures used, and the organization of this report follow below.

### Statement of the Problem

In recent years, management science has developed techniques such as planning-programming-budgeting system (PPBS), management by objectives (MBO), and systems analysis. These techniques are being applied to the management of vocational programs in part and in whole. In practice, however, the concepts from which they derive and their technical procedures are complicated and have been only imperfectly applied to vocational program management. And, though each of these approaches emphasizes a specification of program objectives, an assignment of responsibility, and subsequent measurement of achievements, few attempts have been made to date to establish a feasible framework for applying the concepts or for providing quantitative measures to assess management performance in vocational education.

In an effort to solve this problem, a cost-effectiveness analysis system was developed for secondary vocational programs. The system, consisting of a model, measures, and data forms, can be integrated into existing management systems and can provide analytical techniques and quantitative measures which are prerequisites for the improvement of management systems. Vocational administrators may use the system in setting program goals, in assessing program outputs, and in analyzing program costs. In addition, program effectiveness and the cost efficiency and management performance for vocational programs may be measured.

Though the efficacy of this system is demonstrable, educational change will not occur without its implementation. How is information about the system to be diffused? The term itself -- *diffusion* -- is ambiguous. The literature defines the diffusion process variously and creates confusion by conceptualizing it as a component of the educational change process. Too, there are a number of views of the educational change process. It is variously viewed as a problem-solving process, a research, development and diffusion process and as a social interaction and linkage process. These concepts remain useful in explaining the spread of educational innovations, but a concept which contains all aspects of the educational change process and an operational definition of diffusion is necessary for explaining the diffusion and adoption of an innovative system in the dynamic context of educational change.

A statewide conference has been found valuable in disseminating information about the system and for creating a widespread awareness of its applications. As a main activity of the project, a dissemination conference was convened to make vocational administrators aware of the system and to

facilitate the diffusion and adoption of the system through the state of Indiana.

## Objectives and Procedures

The purpose of this report is to facilitate the diffusion of the cost-effectiveness analysis system for improvement of secondary vocational program management. The objectives of the project are specified as follows:

1. To review the literature dealing with educational innovations and the change process.
2. To develop a conceptual framework for the diffusion and adoption of the cost-effectiveness analysis system.
3. To conduct a statewide conference on cost-effectiveness analysis of secondary vocational programs.
4. To evaluate the conference operation and the system's application.
5. To prepare a technical report describing the conceptual framework and the conference activities, and a final summary report.

To achieve these objectives, the following procedures were used:

1. After a review of related literature, a conceptual framework was developed for the diffusion and adoption of the cost-effectiveness analysis system.
2. The cost-effectiveness documents were disseminated through the ERIC system, through mailing, publications and paper presentations.
3. A statewide conference on cost-effectiveness analysis of secondary vocational programs was conducted at Greenwood, Indiana on June 9-10, 1977.
4. A Project Advisory Committee comprising three state administrators, four local vocational directors, and one university professor provided the project staff with advice and suggestions for planning and conducting the conference and reviewed the products of the project.

5. Quarterly reports on the progress of this project were submitted to the state project monitor and the university contract administration office.

6. This project began in January, 1977 and finished in March, 1978.

## Organization of the Report

This report consists of five chapters. Chapter II summarizes the contents of the cost-effectiveness analysis system, including the conceptual model, measures, and data forms.

Chapter III presents a conceptual framework for diffusing the system.

Chapter IV describes the statewide conference on cost-effectiveness analysis of secondary vocational programs. It surveys the objectives of the conference, summarizes the presentations and the workshop activities, and contains the results of the conference evaluation.

Chapter V draws conclusions on the results of the project.

## Chapter II

# DEVELOPMENT OF THE COST-EFFECTIVENESS ANALYSIS SYSTEM

A cost-effectiveness analysis system was developed at Indiana University-Bloomington with the financial support of the Indiana State Board of Vocational and Technical Education. This system includes a cost-effectiveness analysis model, three kinds of measures, and data forms (Kim and Harris, 1976). These components are briefly summarized below.

### The Cost-Effectiveness Analysis Model for Secondary Vocational Programs

The cost-effectiveness analysis model consists of four major components: (1) vocational programs, (2) program objectives, (3) program outputs, and (4) program costs. It generates three kinds of measures indicating: (1) program's effectiveness, (2) cost-efficiency, and (3) cost-effectiveness and performance ratio. The model also utilizes both student characteristics and community demand and support as inputs to the school system. Economic and noneconomic benefits for the community are considered as the long-term results for the school system (see Figure 1).

#### Vocational Programs

This model is designed to analyze cost-effectiveness of the seven secondary vocational program areas: (1) agriculture, (2) distribution, (3) health occupations, (4) home economics occupations, (5) business and office occupations, (6) technical education, and (7) trade and industry.

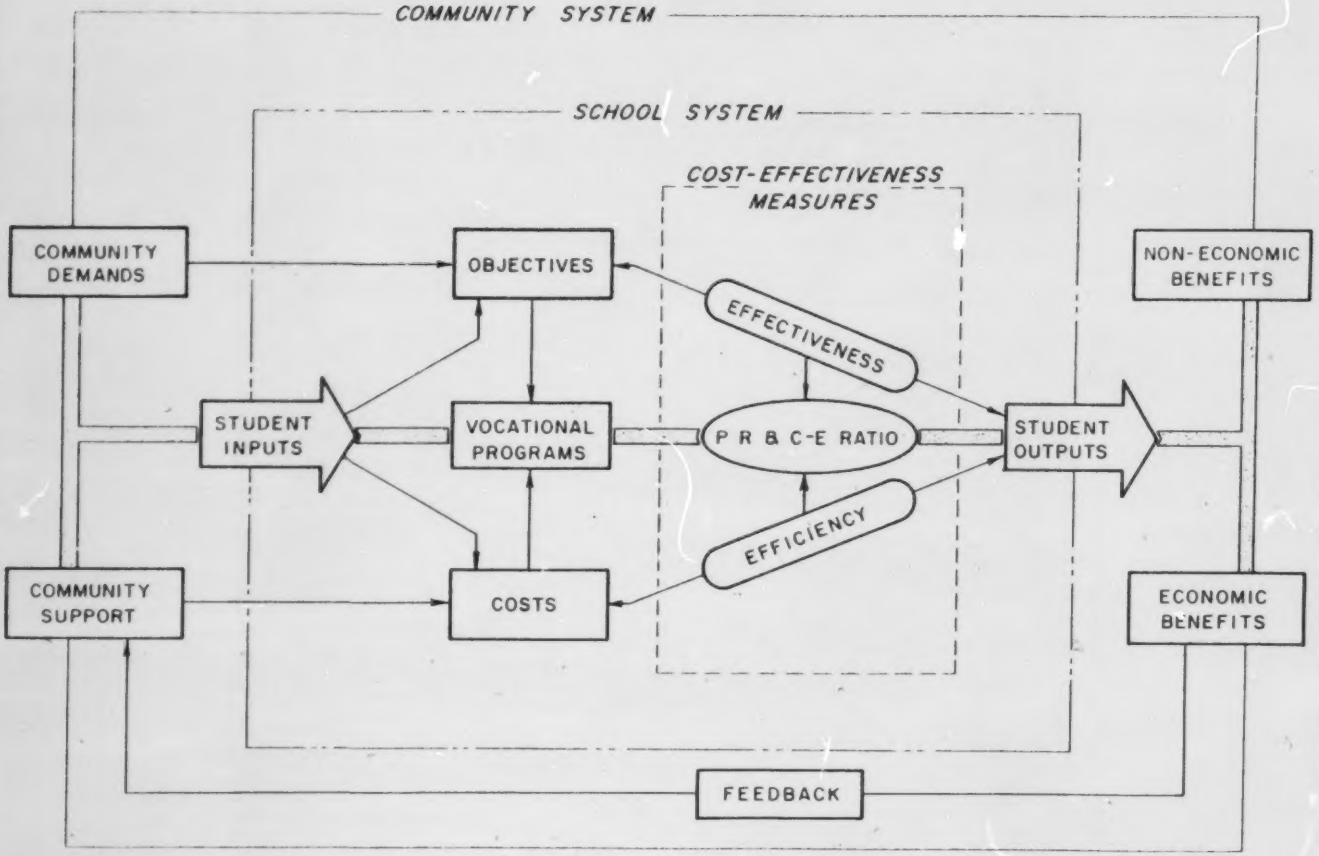


FIGURE 1

A COST-EFFECTIVENESS ANALYSIS
MODEL FOR SECONDARY VOCATIONAL PROGRAMS

Each of the vocational program areas is further classified into the sub-programs or courses outlined in the vocational program classification of the U.S. Office of Education (1969). Within the model, the vocational sub-program areas or courses are defined as instructional programs and serve as basic units of analysis. The model is concerned with cost-effectiveness analyses of vocational instructional programs (such as agricultural production or agricultural mechanics within the agriculture program area).

Program Objectives

A review of related documents enables us to set forth seven objectives for the secondary vocational instruction program:

1. To aid the students enrolled in vocational education to successfully complete a secondary occupational program.

2. To assist special student groups to study successfully in a secondary vocational program.

3. To provide vocational education for secondary school youth commensurate with their occupational interests.

4. To provide leadership development activities for students enrolled in vocational programs through a youth organization functioning as an integral part of the programs.

5. To provide guidance and counseling services (career development) information conducive to continued education or employment for students enrolled in vocational programs.

6. To provide vocational programs to fulfill the requirement of the local labor markets and the employment community manpower needs.

7. To encourage vocational graduates to continue their education after completion of their secondary program.

Each of the program objectives listed above is described in measureable terms as to the degree of student attainment. For example, objective

two includes a number of target goals indicating how many (or what percentage) of students enrolled in the vocational instructional program will complete the program and their anticipated degree of satisfaction with the program (see Appendix A).

Program Outputs

Program outputs are defined as attainment of the objectives and the target goals by means of the vocational instructional programs. Accordingly, the scope and content of the program outputs are consistent with the set of program objectives. Some output indicators provide bases for measuring program effectiveness and cost efficiency.

Program Costs

Program costs are defined as annual expenditures for operating the vocational instructional program at the local school district level. Since the model is basically concerned with the expenditures for the operation of the vocational program, neither foregone income nor the students' time while they are enrolled in the program is included in the program cost. Program costs are divided into direct and indirect costs as recommended by the U.S. Office of Education (Handbook II, 1973).

Direct costs include six items: (1) annual salaries of teaching staff, (2) fringe benefits paid by the school district, (3) travel costs for instruction, (4) instructional supply and material costs, (5) laboratory facilities and equipment costs, and (6) building space use costs.

Prorated expenditures for supportive services are considered as indirect costs of the instructional program. The supportive services are: (1) student support, (2) instructional staff support, (3) general adminis-

tration, (4) school administration, (5) business services, and (6) central support services.

Cost-Effectiveness Measures

Three kinds of numerical measures are generated from the model. Program effectiveness measures are computed as the relationship of program outputs to program objectives. Cost efficiency measures are comparisons of program costs to program output units. The relationship of effectiveness measures to efficiency measures provides cost-effectiveness and/or performance ratios.

Student Input Characteristics

Student characteristics are considered in the model as inputs, especially as they relate to program objectives and costs. Student characteristics to be tabulated may include: (1) sex, age, and ethnic identity; (2) individual needs and ambitions in vocational education; and (3) socioeconomic status of the students' families.

Community Demand and Support

Community demand and support for secondary vocational programs are included in the model as external input factors to the school system. Community demands are identified by population trends, mobility of residents, and manpower needs. The level of economic resources in a community and its willingness to support a school system determines the quantity and quality of human and material resources which are available to operate the vocational programs.

Economic and Noneconomic Benefits

The vocational programs' economic and noneconomic benefits for the community are described in the model as long-range outputs of the school

system. Economic benefits can be measured by employment statistics, earnings, and by the enhanced occupation level of the graduates. Non-economic benefits are to be measured by the degrees of political participation and crime reduction and by the decline in the number of public assistance recipients.

Feedback

The final consideration of the cost-effectiveness analysis model is the feedback loop and input-output relationship to operating vocational programs. As a self-correcting mechanism, feedback relates educational efforts to community demand and support as an aid in the evaluation and planning of vocational programs.

## Formulas for Cost-Effectiveness Measurement and Data Forms

The formulas and computing procedures for three kinds of cost-effectiveness measures and data forms are described below.

Program Effectiveness Measures

Effectiveness is defined as a measure of the achievement of program objectives. Accordingly, program effectiveness is measured by the degree of target goal attainment.

Program effectiveness ($PE_i$) scores are computed by dividing the actual outputs ($O_i$) by the expected target goals ($G_i$) as follows:

$$PE_i = \frac{O_i}{G_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

For example, if 100 percent of the enrollees were expected to complete a program, but 90 percent actually completed the program, the program effectiveness score would be 90 percent.

Furthermore, a number of effectiveness scores can be combined into a program effectiveness index. A composite program effectiveness (CPE) index is made by totaling all available effectiveness scores. Dividing the composite index by a number of effectiveness scores (N) provides an average program effectiveness (APE) index as follows:

$$CPE = \sum_{i=1}^{n} \frac{O_i}{G_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

$$APE = \frac{\sum_{i=1}^{n} \frac{O_i}{G_i}}{N} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

If each program effectiveness score is weighted on the basis of policy preference or by the importance of program objectives, then a weighted composite program effectiveness (WCPE) and a weighted average program effectiveness (WAPE) index can be made as follows:

$$WCPE = \sum_{i=1}^{n} \frac{O_i}{G_i} \cdot W_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

$$WAPE = \frac{\sum_{i=1}^{n} \frac{O_i}{G_i} \cdot W_i}{\sum_{i=1}^{n} W_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Cost Efficiency Measures

Efficiency is measured by the cost and output relationship which results in unit costs. Actual cost efficiency ($CE_{(a)}$) or unit costs can be computed by dividing actual total cost of the program ($C_{(a)}$) by units of outputs such as total number of completions ($O_1$), students enrolled in the program ($O_2$), or student contact hours ($O_3$). Each product is identified as the actual unit cost ($UC_{(a)}$), which is expressed by:

$$CE_{(a)} = \frac{C_{(a)},}{O_1} \quad \frac{C_{(a)},}{O_2} \quad \frac{C_{(a)},}{O_3} \quad \text{or } UC_{(a)} \quad \ldots\ldots\ldots\ldots \quad (6)$$

Budgeted cost efficiency ($CE_{(b)}$) measures are made by analyzing budget costs for the vocational program in the same way as Formula 6 above and are expressed by:

$$CE_{(b)} = \frac{C_{(b)},}{O_1} \quad \frac{C_{(b)},}{O_2} \quad \frac{C_{(b)},}{O_3} \quad \text{or } UC_{(b)} \quad \ldots\ldots\ldots\ldots \quad (7)$$

Too, a cost efficiency index (CEI) can be derived from the comparison of actual total or unit cost to budgeted total or unit cost for the vocational instructional program. The actual unit cost is compared to average or standardized cost to produce a cost efficiency index. By comparing (6) with (7), a cost efficiency index (CEI) is made as follows:

$$CEI = \frac{C_{(a)}/O_1,}{C_{(b)}/O_1} \quad \frac{C_{(a)}/O_2,}{C_{(b)}/O_2} \quad \frac{C_{(a)}/O_3,}{C_{(b)}/O_3} \quad \text{or} \quad \frac{UC_{(a)}}{UC_{(b)}} = \frac{C_{(a)}}{C_{(b)}} \quad \ldots \quad (8)$$

Cost-Effectiveness Ratio and Performance Ratio

Finally, based upon the measures of program effectiveness and cost efficiency, a cost-effectiveness ratio and a performance ratio can be computed. A cost-effectiveness ratio (C/ER) is constructed as follows:

$$C/ER = \frac{(2),\ (3),\ (4),\ \text{or}\ (5)}{(6)} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (9)$$

The ratio identifies the degree of goal attainments per unit cost. This computation of a cost-effectiveness ratio is somewhat different from the typical method of dividing outputs by inputs of total or unit cost (Knezevich, 1973, p. 204; Handbook II, 1973, p. 70). The typical method lacks measures of effectiveness as defined in this paper and may be referred to as a cost-output ratio rather than a cost-effectiveness ratio.

A performance ratio (PR) is generated from the division of program effectiveness by the cost efficiency index:

$$PR = \frac{(2),\ (3),\ (4),\ \text{or}\ (5)}{(8)} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (10)$$

This performance ratio is a precise index representing the relationship between the program effectiveness and cost efficiency as measured by formulas one through nine.

Cost-effectiveness measures can be used to evaluate existing vocational programs in terms of vocational program effectiveness, the extent to which the program objectives are being achieved, and in terms of cost efficiency. Cost-effectiveness and performance ratios will provide administrators with reliable measures of their programs' effectiveness and efficiency. With

these data a program found to be ineffective and inefficient can be readily modified, or an alternative program can be developed.

In addition, these measures can be used for planning and improving vocational programs. A short-range plan can be developed to increase program effectiveness and/or cost efficiency. A long-range plan can be made to develop strategies for the improvement of overall vocational programs as well as for the development of new vocational programs.

Data Forms for Cost-Effectiveness Analysis

The implementation of cost-effectiveness analysis requires appropriate data pertaining to each of the components. To collect required data, a set of five data forms have been developed and are a part of the Technical Report.

School Corporation (District) Information (I). The instrument is designed to collect general information on the average daily membership, school hours, student contact hours, full-time equivalent teachers, and building space requirements.

Secondary Vocational Instructional Program Data (II). Instructional program data focus on student enrollments and completions and on student participation in youth organizations and ancillary services.

Students' Follow-Up Program Rating Scale (III). The questionnaire was developed to enable graduates to rate the vocational instructional program which they have completed. The questionnaire measures graduates' satisfaction with: (1) their vocational training and job preparation, (2) their present jobs, (3) the youth organization activities in their programs, (4) ancillary services available to them, and (5) their preparation for advanced studies.

Employers' Opinions on Vocational Training of Employees (IV). This questionnaire is designed to explore opinions of employers about the skills, knowledge, and abilities of employees who have completed a vocational training program, as well as employment policies toward persons trained in vocational programs.

Vocational Instructional Program Cost Data (V). Based on the Handbook II, as developed by the U.S. Office of Education, these data forms are designed to collect information on expenditures incurred by the school system in instructional and supportive services.

## Summary

The cost-effectiveness analysis system for secondary vocational programs includes a cost-effectiveness analysis model, three kinds of measures, and data forms. The model consists of three major components: (1) program objectives, (2) program outputs, and (3) program costs. The cost-effectiveness measures are of program effectiveness, cost efficiency, and management performance. Information derived from these measures is useful in evaluating and planning vocational programs. Five data forms have been developed to collect and analyze cost-effectiveness data. They are available in the original report, A Cost-Effectiveness Analysis Model for Secondary Vocational Programs: Technical Report.

## Chapter III

# A CONCEPTUAL FRAMEWORK FOR THE DIFFUSION OF THE COST-EFFECTIVENESS ANALYSIS SYSTEM

In this chapter the concept of educational change through the diffusion of educational innovations is reviewed, and a conceptual framework which has been developed for diffusing the cost-effectiveness analysis system is discussed.

## The Process of Educational Change

Educational change may be defined as planned alteration in educational goals and structures at any level. Some authorities view the change process as a problem-solving and self-renewal process within the system while others see it as a research, development, and diffusion process (PDD), and still others see it as a social interaction and linkage between the resource system and user system.

### The Problem-Solving and Self-Renewal Process

The concept of a problem-solving process may be traced back to the thinking process conceptualized by Dewey (1933, pp. 106-116). As a change process, however, Lewin (1952, pp. 459-473) delineates unfreezing, moving, and freezing the client system, which is later expanded to seven stages in the work of Lippitt, Watson, and Westley (1958, pp. 135-141). The seven stages are: (1) developing a need for change, (2) establishing a change relationship, (3) diagnosing the problem, (4) examining alternative goals and establishing plans of action, (5) transforming plans into change

efforts, (6) generalizing and stablizing the change, and (7) achieving a terminal relationship. These seven stages are of necessity dependent on the self-motivation of the client to initiate change. Without self-motivation the client cannot change and successfully progress through the logically interrelated stages.

Miles and Lake (1967, pp. 81-88) described a self-renewal strategy for the New York Region Cooperative Project for Educational Development. The approach placed the change agent in the position of initiating awareness and focused on the need for the creation of change agent teams to develop a strategy for planned change within the client system. According to Bhola (1977, p. 12), the organization development model is included in this category of change process, for school systems, being organization-centered, do not have to be told what innovations to adopt and must be prepared to do their own problem-solving.

At the school level, the problem-solving and organizational development approaches haven't placed sufficient emphases on (1) clarifying the innovation, (2) increasing motivation, and (3) facilitating the development of internal capability for establishing the new roles, procedures and goals associated with the innovation (Smith, 1972). In addition, the lack of problem identification and the failure to establish feedback mechanisms have been deficient factors in the problem-solving approach (Gross, Giacquinta, and Bernstein, 1971, p. 194).

Research, Development and Diffusion Process (RDD)

While the problem-solving and self-renewal process is initially client-oriented, the research, development, and diffusion process is researcher-oriented in that any change process begins with a research stage. The

researcher views the receiver of new ideas as essentially passive and concentrates on closing the gap between his theory and the receiver's practices.

Theoretically, then, four stages are conceptualized in the RDD process: (1) pure research, (2) development which identifies operational problems and formulates practical solutions, (3) diffusion of the new knowledge, and (4) adoption of the development (Guba, 1968, pp. 42-43). Guba's approach, then, makes a distinction between research (the discovery of new ideas) and development (the solution to problems). Unlike Guba, Miles (1964, p. 19) and Brikell (1964) join the notions of research and development into a single design stage in which both invention and production take place.

Brikell (1964) views design as "the translation of what is known about learning into programs for teachers" (p. 498), and stresses that developers should be aware of the needs and problems of local schools in order to design relevant innovations. The design concept emphasizes the need for the development of innovations which pertain to actual educational needs and practices.

The diffusion stage of the RDD process is characterized by demonstrations intended to "*[build]* awareness and understanding of an innovation and *[cause]* practitioners to consider its features with a view to possible application" (Guba, 1968, p. 49). Brikell (1966, p. 99) suggests three relevant activities: (1) dissemination aimed at creating awareness and arousing interest, (2) demonstration and provision of materials, and (3) provision for training and continuing support. (Brikell stresses the importance of training.) Pinney (1961, p. 8) emphasizes that educational development organizations must inform all levels at local schools, while Lippitt (1966, p. 17) stresses that

inservice training of teachers must be provided at the diffusion stage of the RDD process.

The adoption stage as described by Guba (1968) includes trial, installation and institutionalization for "a problem solution or invention within a particular local setting" (p. 49). And according to Miles (1964), the adoption stage of the RDD process is initiated by external agencies which are responsible for encouraging and supporting the target system throughout the adoption process (p. 20).

Rogers (1962) perceives five stages through which any user of an innovation must progress: (1) awareness of an innovation, (2) interest in the innovation (resulting in the pursuit of information concerning its utility), (3) evaluation of the innovation, (4) small scale implementation of the innovation, and (5) large scale adoption of the innovation (p. 81). Essentially, this description of the adoption process focuses on the single user and his perception of the innovation.

Criticisms have been expressed concerning the linear nature of Guba's four stages of the RDD process (see page 19). According to Carter (1966), the sequence from research through development to utilization is not an orderly progression but is, rather, a simultaneous combination of stages (pp. 4-5). The RDD approach is also criticized for its inability to account for initiatives introduced at multiple points throughout the four stage sequence (Kreitlow and MacNeil, 1969, p. 5).

In response to these criticisms, the diffusion and adoption stages can be viewed as two facets of a single stage rather than as stages in linear sequence. From this point of view, "social interaction" may be a concept useful for those who would understand the change process.

A Process of Social Interaction and Linkage

Rogers and Shoemaker (1971, p. 7) see the social change process occurring in three sequential steps: (1) invention, the process by which new ideas are created or developed; (2) diffusion, the process by which these new ideas are communicated to the members of a social system; and (3) consequences, the changes that occur within a social system as a result of the adoption or rejection of the innovation. They assert that communication is essential for social change and that social interaction between the potential adopter and his reference group is the major source of communication concerning the innovation. As they see it, the social interaction perspective presupposes that a research product has been developed and partially diffused and concentrates on the diffusion stage prior to the decision to accept or reject an innovation. According to another researcher, a social interaction perspective recognizes the importance of social structure, interpersonal interaction, and the flow of communication (Carlson, 1965).

From a different perspective, a linkage theory has been developed which posits a two-way interaction process between the users and the sources of research products. Havelock (1971, pp. 21-29) describes a linkage approach consisting of seven elements: (1) linkage (as the degree of interpersonal connection and mutual communication relations), (2) structure (as the systematic organization and coordination of elements within the research-utilization continuum), (3) openness (as readiness to give and to receive new information), (4) capacity (as a broad range of human, fiscal and political resources), (5) reward (as positive reinforcement), (6) proximity (as physical accessibility), and (7) synergy (as an active redundancy of forces diverted at the adoption of an innovation).

In terms of the social interaction approach, the linkage, reward, proximity, and synergy factors correspond to interconnections within the social relations network to the reinforcing effect, to informal contact, and to the overall repetition of social contact within the social system, respectively. The factor of linkage also addresses the need for connecting the procedures of new knowledge to systems which can use the knowledge, and the factor of structure stresses the need for a coordinated and systematic approach to the process of knowledge utilization (Paul, 1974, p. 51). Another theorist emphasizes the building of organizational links for moving knowledge through essential phases to widespread and effective use (Chase, 1970, p. 302). Systematic linkage, then, has been viewed as the essential process in directed change by which a change-agent organization attempts to improve the practices of target groups within the social system (Loomis, 1963, p. 202). Thus, the link approach concentrates on maintaining inter-organizational interaction rather than interpersonal communication.

The NIE Dissemination and Resources Group (1978) summarizes three communication models to aid in the dissemination and utilization of educational knowledge: (1) the RDDA model, which puts stress on the R & D knowledge or product; (2) the problem-solving model on the operational site, such as the local educational agency (LEA) or individual school; and (3) the social interaction model utilizing person-to-person communication within and between the R & D producer and the systems. These models devote substantial resources to understanding and improving linkage mechanisms between R & D and user communities in education (pp. 9-10).

Hull, Kester, and Martin (1973) have developed a conceptual framework for the diffusion of innovations in vocational education. It consists of

three relational conditions: (1) the antecedent condition, (2) the interactive condition, and (3) the consequent condition. It contains five structural dimensions: (1) change advocate, (2) targeted consumer, (3) innovation, (4) strategy-response, and (5) impact (p. 13). Drawing on these previous works, an attempt is made to develop a conceptual model to generate some strategies for diffusing educational innovations.

## A Conceptual Framework for Diffusing the System

To aid in the diffusion of the cost-effectiveness analysis system, a conceptual framework has been devised here which emphasizes the interaction process within the RDDA process, and a recycling process is envisioned with regard to production and utilization of educational innovations.

Four major elements of the change process are identified: (1) the resource system, (2) educational innovations, (3) the user system, and (4) consequences. Relating these events to each other, a recycling process containing four major activities is conceptualized: (1) research and development, (2) initiation and decision, (3) implementation and installation, and (4) evaluation and feedback. Within the recycling process, the diffusion and adoption stages are seen as an interacting process between the resource and user systems. An essential feature of the linkage is its connection of the diffusion and adoption activities (see Figure 2).

### The Resource System

The resource system may in actuality be only a professional researcher or small group, but the term encompasses a broad range of professionals in production and diffusion of research and development products. Some individuals or institutions assume both production and diffusion roles whereas else-

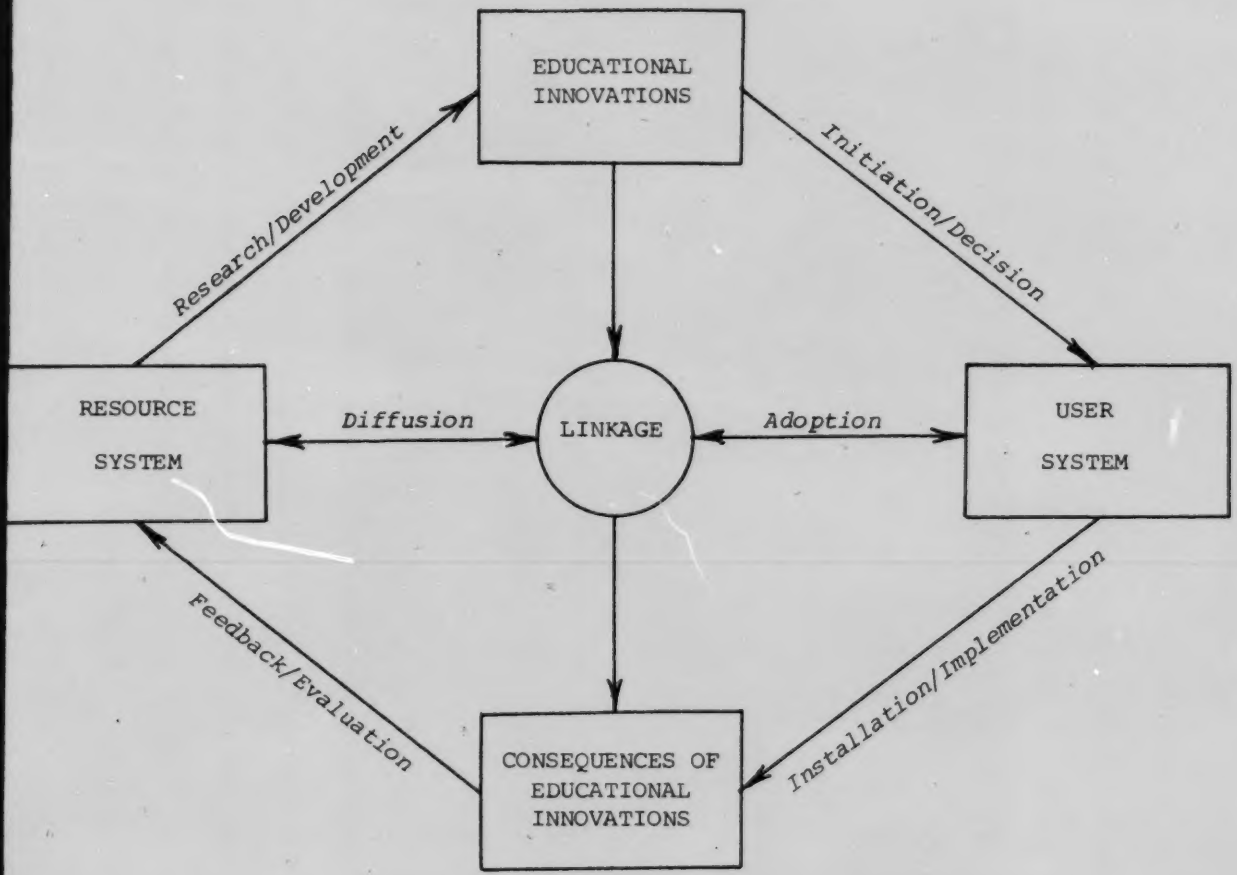


FIGURE 2

A CONCEPTUAL FRAMEWORK FOR THE
DIFFUSION/ADOPTION OF THE COST-EFFECTIVENESS ANALYSIS SYSTEM

where, the professionals are more specialized. But whatever his precise role, the development of educational innovations is necessarily a major function of the educational researcher, who, like any researcher, should be free of pressures for immediate payoff from the user (Guba, 1967, p. 8).

However, user involvement in the R & D process is helpful in producing innovations which will ultimately be implemented by the user. This interpersonal (or interorganizational) relationship of the resource system to the user system is a necessary feature of the diffusion process, and the resource system should accept feedback results from the practitioners.

## Educational Innovations

The terms of innovation and change are often used interchangeably (Miles and Lake, 1967, p. 14; Netzer and Eye, 1970, p. 3). An innovation is defined as "an idea, practice or object perceived as new by an individual" (Rogers and Shoemaker, 1971, p. 19), or as "a research-based educational product perceived as new by a user" (Hull, et al., 1973, p. 6). Thus, educational innovations can be viewed as products newly developed for use by an educational consumer.

Miles and Lake (1967) describe some educational innovations which have, in their presentation, aspects of a social system. They are: (1) boundary maintenance operations, (2) size and territoriality, (3) physical facilities, (4) time use, (5) goals, (6) procedures, (7) role definition, (8) normative beliefs and sentiments, (9) structure (relationship among parts), (10) socialization methods, and (11) linkage with other systems (pp. 15-18).

The Wisconsin R & D Center for Cognitive Learning has developed the Individually Guided Education (IGE) program as a comprehensive innovation

system for educational change. The IGE system has seven components: (1) a multiunit school (MUS), (2) a model for developing measurement tools and evaluation procedures, (3) a model for individualized instructional programming, (4) curriculum materials, (5) a program of home-school-community relations, (6) facilitative environments, and (7) continuing research and development (Klausmeier, Quilling, Sorenson, Way, and Glasrud, 1971). Focusing on moving school organizations from age-graded, self-contained classrooms to multiunit schools, IGE stresses the improvement of educational opportunities for children, the need for self-renewal by the staff, and the facilitation of research and development within the schools.

Innovations have various attributes which must be considered by the receiver during the decision-making and implementation process. Rogers and Shoemaker (1971) delineate five attributes they think are the most important in explaining the rate of adoption. They are: (1) relative advantage (the degree to which an innovation is perceived as better than the idea it supercedes), (2) compatibility (the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the receivers), (3) complexity (the degree to which an innovation is perceived as difficult to understand and use), (4) trialability (the degree to which an innovation may be experimented with on a limited basis), and (5) observability (the degree to which the results of an innovation are visible to others) (pp. 22-23). In addition to these five attributes, Hull et al. (1973) list six more characteristics, such as: (1) financial costs, (2) time considerations, (3) space requirements, (4) magnitude of innovation, (5) value orientations, and (6) specification of support needed (p. 19).

Briefly then, the form of educational innovations ranges from the simple and piecemeal to complex systems; additionally, innovations have certain attributes to which users may refer in making decisions on adoption and implementation.

The User System

The term "User System" denotes individual organizations which can receive benefits from educational R & D. If the resource system is the producer of educational innovations, the user system may be thought of as an educational consumer. Although they are the recipients of innovations, user systems must actively seek information on educational innovations as well as press for their adoption. But they must be free from outside pressures as they consider the various "innovations."

During the decision-making process, the linkage of the user system to the resource system is necessary, and when a decision to adopt an innovation is reached, the decision remains to be implemented (Gross, et al., 1971, p. 7).

The implementation of innovations is the key to the change process. Guba (1968) conceptualizes trial, installation, and institutionalization phases of implementation. Regarding the issue of the significance of the actual change wrought by the innovation versus the structural change in the user system during implementation, Pinney (1961) stresses that successful implementation requires that the changes in the user system be attended to. Adoptive modification of innovations is suggested to support the notion that change in the innovation is inevitable (Sikorski, Turnbull, Thorn, and Bell, 1976). The term reinvention has been proposed to represent the degree to which an innovation is changed in the process of implementation (Agarwala-Rogers, Rogers, and Wills, 1977). With regards to changes in both the innovation and the

user system, The Rand Corporation describes a process of mutual adaptation, which is defined as an organizational process in which an innovation is modified to fit the institutional setting, and in which the organization changes to meet the requirements of the innovation (Greenwood, Mann, and McLaughlin, 1975, p. 31).

## Consequences of Educational Innovations

The implementation of education innovations fosters changes in the user system or on the targeted groups. Three kinds of consequences of adoption or rejection of innovations have been suggested: (1) functional versus disfunctional consequences, (2) direct versus indirect consequences, and (3) manifest versus latent consequences (Rogers and Shoemaker, 1971, p. 17). These classifications are helpful in determining the desirability, direction and feasibility of the consequences of educational innovations.

Pincus (1974, p. 117) describes five effects of innovations on school operations: (1) increasing the level of resource use, (2) changing the resource mix, (3) changing the instructional processes or methods, (4) affecting administrative management, and (5) changing either the organizational structure of the schools or their relation to external authority. More simply, three types of change common in educational institutions are illustrated by "the policy/structural/curricular breakdown" (Zaltman, Florio, and Sikorski, 1977, p. 18). The Pincus typology and the Zaltman model are both useful in classifying educational innovations by their impact as well as in evaluating the consequences of educational innovations on targeted groups such as administrators, teachers, and/or students.

After evaluating the consequences of educational innovations, some results should be fedback to the resource system as inputs newly available to the research and development process. The feedback process can be used as an interaction mechanism between the resource and user systems which improves the consequences of educational innovations.

The Linkage Between the Resource and User Systems

The diffusion process is seen from the perspective of the resource system to include two components: (1) dissemination; that is, informing or creating widespread awareness of the innovation, and (2) demonstration; that is, presenting the innovation in an operational mode to enhance its image (Guba, 1965).

The initial stage of change is the introduction of the ultimate user to the innovation. In this sense, dissemination by the resource system corresponds to awareness of the innovation by the user system. A similar relationship exists between demonstration by the resource system and the interest in innovation by the user system. In other words, a dynamic relationship exists between the resource and user systems. The resource system's dissemination activities increase the user system's awareness of and interest in educational innovations. From this point of view, linkage activities merely take advantage of a naturally existing relationship.

Three major types of linkage connections are represented by the terms conveying, consulting, and training (Havelock, 1971, p. 4). These three functions may be performed by three different agents. For instance, one conveys or transfers innovations from producer to user; another, the consultant, helps to identify and solve problems related to innovation, and

another, the trainer, helps the user to understand the innovation prior to its adoption. Paul (1974) conceptualizes linkage as representing intersystem connectedness, intersystem relationships, or intersystem interaction (p. 77), and he views the mediating system as being placed between the resource and user systems. The interposition of the mediating system results in the augmentation of resource system's diffusion effort and facilitates the linkage between the user and resource systems (p. 82).

The linkage system which connects the information sources to the potential user contains common elements: direct mail, advertising, articles/reports/books, demonstrations, salespeople, field agents, telephone contacts, meetings, action research, confrontation, workshops, information systems, and training manuals (Zaltman, et al., 1977, pp. 93-94), all of which serve useful purposes.

Linkage activites can be classified as either (1) one-way (spreading information on educational innovations through mass media, mediating channels, or information systems), or (2) two-way (interaction between the resource and consumer systems through meetings or workshops).

## Approaches to Diffusing the Cost-Effectiveness Analysis System

In diffusing the cost-effectiveness analysis system, both one-way and two-way approaches were utilized.

### Production of the Reports

When the cost-effectiveness analysis project was completed, 350 copies of the Technical Report, 500 copies of the Administrator's Manual and 50 copies of the Final Report were produced. The Technical Report presents a

cost-effectiveness analysis model for secondary vocational programs, along with five kinds of data instruments for collecting and analyzing the data which are necessary to a cost-effectiveness study.

The Administrator's Manual is designed to increase secondary vocational administrators' awareness of cost-effectiveness analysis concepts and analytical techniques. It provides step-by-step activities and details analytical techniques for conducting a cost-effectiveness study using the model and data forms. The Final Report summarizes the concepts and techniques described in the Technical Report and the Administrator's Manual.

One-Way Approaches

These cost-effectiveness analysis reports are included in the ERIC Clearinghouse on Career Education. Some copies of the Technical Report and Administrator's Manual were mailed to vocational administrators and university professors who were concerned with the cost-effectiveness study. During the project period, three related papers were presented at national meetings and two papers were published in professional journals.

ERIC System. The cost-effectiveness analysis reports were diffused through the ERIC system (under Career Education). The document resumes appear in RESOURCES IN VOCATIONAL EDUCATION (Vol. 10, No. 3, 1977, pp. 29-30), which was published by The Center for Vocational Education, The Ohio State University. Their ERIC accession numbers, authors and titles are as follows:

ED 130 081 CE 008 487
Kim, Jin Eun and Harris, Robert C.
A Cost-Effectiveness Analysis Model for Secondary Vocational Programs: Technical Report. Bloomington: Indiana University, June, 1976.

ED 130 082 CE 008 488
Kim, Jin Eun; Harris, Robert C.; and Ruby, Donald D.
Cost-Effectiveness Analysis of Secondary Vocational Programs: Administrator's Manual. Bloomington: Indiana University, June, 1976.

ED 130 083 CE 008 489
Harris, Robert C. and Kim, Jin Eun
Cost-Effectiveness Materials for Locally Conducted Secondary School Vocational Education Programs Investigations: Final Report. Bloomington: Indiana University, June, 1976.

Use of Mail. Ten copies of all three reports were submitted to the Indiana State Board of Vocational and Technical Education and an equal number were submitted to the U.S. Office of Education. Fifty copies of the Technical Report and Administrator's Manual were mailed to secondary vocational administrators to prepare them for a statewide cost-effectiveness conference in Indianapolis on June 9-10, 1977. A copy of the Administrator's Manual was provided to each of the 40 participants in the National Workshop on Improving Cost-Effectiveness of Vocational Programs which was conducted in Indianapolis on March 6-9, 1978. About 200 copies of the Technical Report and Administrator's Manual were mailed to individuals and institutions which had previously expressed an interest in the cost-effectiveness study.

Publications in Professional Journals. Two papers by this author were published in professional journals. They are:

*A Cost-Effectiveness Analysis Model for Evaluating and Planning Secondary Vocational Programs.* EDUCATIONAL PLANNING, Journal of International Society of Educational Planners, Vol. 4, No. 2, October, 1977.

*Cost-Effectiveness Measures for Evaluating Secondary Vocational Programs.* CHANGING AND PLANNING, Journal of School Administrators, Vol. 8, No. 2, Summer, 1977.

Presentations. Four related papers were presented by this author at state and national level meetings. They are listed as follows:

> *Administrator's Accountability: Program Evaluation Using the Cost-Effectiveness Analysis Technique.* Presented at the 1977 Spring Indiana Vocational Administrator's Conference, New Albany, Indiana, March 9-11, 1977.
>
> *Management Systems Based on a Cost-Effectiveness Model.* Presented at the 1977 American Educational Research Association (AERA) Meeting, New York, April 4-8, 1977. (ED 139 097)
>
> *A Cost-Effectiveness Analysis Model for Evaluating and Planning Secondary Vocational Programs.* Presented at the 1977 Educational Planners (ISEP) Meeting, New Orleans, October 4-7, 1977.
>
> *A Guide to Conducting Cost-Effectiveness Analysis of Secondary Vocational Programs.* Presented at the 1977 American Vocational Education Research Association (AVERA), Atlantic City, New Jersey, December 2-7, 1977.

Each paper was presented to a different group of professionals in educational administration, planning, and research.

Through these one-way approaches, the cost-effectiveness model, measures, and data forms were presented to a variety of educational professionals. Many requests for a copy of the reports and papers were received and comments on the products were offered by many professionals and practitioners in education. Special remarks appeared in the letters of Dr. Richard Gousha, Dean of The School of Education, Indiana University, and Dr. William McLure, Director of The Bureau of Educational Research, University of Illinois at Urbana-Champaign. The following statements are drawn from those letters:

> Thank you for the copies of your latest reports, Cost-Effectiveness Analysis of Secondary Vocational Programs: Technical Report and Administrator's Manual. I have looked them over and am most impressed with the quality of work undertaken by the project and the obviously high quality of the results. (from Dean Gousha's letter)

> I want to thank you for the copies of your cost-effectiveness study . . . I have avoided the cost-effectiveness model because measures of "effectiveness", "outcomes", "results", simply do not exist except in very superficial form. However, your treatment of hypothetical measures should be helpful in illustrating the next important phase of knowledge to be explored after having systematic and dependable measures of differential costs among programs. (from Dr. McLure's letter)

Two-Way Approaches

To develop a link between the resource system and the user system while these cost-effectiveness documents were being prepared, a Project Advisory Committee was organized and three local vocational directors served as committee members. The three vocational directors helped to conduct a statewide conference on the diffusion of the cost-effectiveness analysis system.

Advisory Committee as a Link. The Project Advisory Committee consisted of three state vocational officers, one professor, and three local vocational directors. The committee members reviewed and made comments on the research. The three local directors provided useful data which were needed for the development of the cost-effectiveness model and the data forms. Their involvement constituted a linkage between the project staff and the user system and increased the practical relevance of the research.

Statewide Conference. A statewide conference was convened to disseminate the cost-effectiveness system to secondary vocational administrators in the State of Indiana. The main purpose was to increase the participants' awareness of cost-effectiveness concepts and analytical techniques through small group workshops. The two-day conference provided an opportunity for direct interaction between the project staff and potential users of the

cost-effectiveness analysis system. More detailed information on the conference will be presented in Chapter IV.

## Summary

The process of educational change through the diffusion of educational innovations was reviewed and a conceptual framework was developed with emphasis on the interaction process within the research, development, and diffusion process. The framework includes four major elements which are identified as (1) the resource system, (2) educational innovations, (3) the user system, and (4) consequences of educational innovations. Connecting these elements is a recycling process of four major activities: (1) research and development, (2) initiation and decision, (3) implementation and installation, and (4) evaluation and feedback. Within the recycling process, diffusion and adoption activities are linked by an interaction process between the resource and user systems.

In diffusing the cost-effectiveness analysis system, one-way and two-way approaches were utilized. From the perspective of the project staff as a resource system, one-way approaches are illustrated by (1) the use of the ERIC system, (2) mailings, (3) publications in professional journals, and (4) paper presentations. The involvement of local vocational directors in the process of the system development is an example of a linkage between the resource and user systems. The convening of a statewide conference was an essential activity in the diffusion and adoption process.

# Chapter IV

## STATEWIDE CONFERENCE FOR DISSEMINATING THE COST-EFFECTIVENESS ANALYSIS SYSTEM

Chapter IV presents the objectives of and preparation for the statewide conference, describes the group workshops, and evaluates the conference operation and activities.

### Objectives of and Preparation for the Conference

#### The Objectives of the Conference

In an effort to facilitate the dissemination of the cost-effectiveness analysis system, a statewide conference was prepared for secondary vocational administrators in the state of Indiana. The conference was held at the Ramada Inn, Greenwood, Indiana on June 9-10, 1977. The objectives of the conference were:

- To increase awareness of the cost-effectiveness analysis system within the Planning, Programming, Budgeting System (PPBS) context.
- To improve participants' analytical techniques in:
  - Specifying program objectives
  - Assessing program outputs
  - Determining program costs
  - Computing cost-effectiveness measures
- To evaluate the cost-effectiveness analysis system in terms of its attributes.

To reach the objectives, the following procedures were employed. A Project Advisory Committee comprising four state vocational administrators, three local vocational directors, and one university professor was organized. The committee suggested: (1) publicizing the conference at the 1977 Indiana

Vocational Administrators' Spring meeting and conferring informally at that time with administrators, (2) encouraging the participation at the conference of all vocational school staff with business management responsibilities, and (3) the mailing of the cost-effectiveness analysis Technical Report and Administrator's Manual to participants upon receipt of their registration.

At the 1977 Vocational Administrators' Spring meeting, held in New Albany, Indiana, the Project Director presented an outline of the cost-effectiveness analysis system. Participants at that meeting were surveyed for suggestions relating to conference planning. It was found that a majority of the secondary administrators was interested in attending the conference and preferred Thursday and Friday of the second week in June as conference dates.

Following the Advisory Committee's suggestions and the survey results, the conference was planned and the following steps were taken:

- June 9th and 10th were selected as dates for the conference.
- The Ramada Inn, south of Indianapolis, was selected as the conference site.
- The program agenda was designed to include registration forms which were mailed to vocational administrators in the state.
- Follow-up letters were sent as reminders to those who did not respond.
- Copies of the Technical Report and Administrator's Manual were sent to each of the registrants for their review prior to the conference.
- The two-day conference was held in cooperation with the State Board of Vocational and Technical Education and the Department of Public Instruction.

Conference Agenda and Participants

The conference opened with a general session and three topic presentations, continued with three group workshop sessions, and ended with a final session of group presentations and the evaluation. Table I describes the conference program and activities.

Welcome and Orientation. Dr. Thomas R. White, Chairman of the Department of Vocational Education, Indiana University-Bloomington, welcomed the conference participants and presided over the orientation session. Dr. Don K. Gentry, Executive Officer/State Director, State Board of Vocational and Technical Education, also welcomed the participants and commented that the cost-effectiveness analysis system is a valuable tool in the administration of vocational programs. The administrators were encouraged to concentrate their efforts on the utilization of vocational education resources rather than on the concern of funding sources and incomes. Dr. Jin Eun Kim, Project Director, expressed his appreciation to the State Board and the Division of Vocational Education, Department of Public Instruction, for their cooperation with the conference, and he provided the participants with an overview of the conference program and activities. Dr. Michael Brici, Director of Division of Vocational Education, State Department of Public Instruction, remarked on the workshop program and introduced Dr. Riley.

Presenters and Small Group Leaders. Dr. William Riley, Director of Division of School Financing, State Department of Public Instruction, spoke on the new budgeting and accounting system to be adopted by the Indiana School Corporations. His presentation was tied to the cost-effectiveness analysis system.

Mr. Lee Thompson, Project Assistant, talked about the determination of program objectives, and Dr. Don E. Pennington, Vocational Director, Washington

TABLE I

CONFERENCE AGENDA ON COST-EFFECTIVENESS ANALYSIS
OF SECONDARY VOCATIONAL PROGRAMS

| | | |
|---|---|---|
| Thursday, June 9, 1977 | | |
| 9:00 - 9:30 a.m. | Registration | |
| 9:30 - 9:40 a.m. | Welcome | Don K. Gentry |
| 9:40 - 9:50 a.m. | Orientation | Jin Eun Kim |
| 9:50 - 10:50 a.m. | New Budgeting and Accounting System in Indiana | William Riley |
| 10:50 - 11:00 a.m. | Break | |
| 11:00 - 12:00 p.m. | Determination of Program Objectives and Target Goals | Lee Thompson |
| 12:00 - 1:30 p.m. | Lunch | |
| 1:30 - 2:30 p.m. | Group Workshop (1): Goals and Outputs | |
| 2:30 - 2:40 p.m. | Break | |
| 2:40 - 3:30 p.m. | Analysis of Program Costs | Don E. Pennington |
| 3:30 - 5:00 p.m. | Group Workshop (2): Cost Analysis | |
| 5:00 - 7:30 p.m. | Dinner | |
| 7:30 - 9:00 p.m. | Computation of Cost-Effectiveness Measures | Jin Eun Kim |

TABLE I, continued

Friday, June 10, 1977

| | | |
|---|---|---|
| 8:00 - 9:20 a.m. | Group Workshop (3): C-E Measurement | |
| 9:20 - 9:50 a.m. | Interpretation and Use of the C-E Measures | Jin Eun Kim |
| 9:50 - 10:00 a.m. | Break | |
| 10:00 - 11:00 a.m. | Group Presentation and Comments | Jin Eun Kim |
| 11:00 - 12:00 p.m. | Summary and Evaluation | Jin Eun Kim |
| 12:00 p.m. | Adjourn | |

Township, presented an analysis of program costs. Dr. Jin Eun Kim spoke about the computation of cost-effectiveness measures and presided over the remaining sessions. Mr. Thompson, Dr. Pennington, and Dr. Kim, along with Mr. Rod McKinney, Vocational Director, Benton Community Area Vocational School, served as small group leaders.

Participants. Thirty of forty preregistered administrators attended the conference. Five people were from state vocational education agencies, and twenty-five people were local secondary vocational administrators. The names and addresses of all participants are listed in Appendix B.

Small Group Workshops. The participants were divided into four small groups chaired by the above mentioned men; the groups worked on the determination of program target goals, the analysis of program costs, and the computation of cost-effectiveness measures using hypothetical data which were provided by the project staff.

## New Budgeting and Accounting System in Indiana

William Riley's presentation considered: (1) the background of the program budgeting system in Indiana, (2) new budget forms, (3) classification of programs, (4) objects of expenses, and (5) the accounting system. During the presentation, questions were received from the audience, responses were offered, and some reference materials were handed out. Dr. Riley's remarks (edited for publication):

### Background of the Program Budgeting System in Indiana

A bill passed by the 1971 General Assembly was attributed to the changing sensibilities for greater fiscal accountability in the late 1960's.

Contemporary planning, programming, budgeting, and evaluation system concepts were reflected in the law and implementation guidelines were specified. The law was amended several times, most recently in 1976, though it often appeared that the entire concept would be scrapped.

The 1976 version essentially says that the Indiana Board of Accounts and Commission on General Education shall sit down at the same table and study the plan and, in fact, describe and implement a cost accounting system for comparison purposes. We fully well understand that it is difficult to compare two given programs for a lot of different reasons. But on a statewide basis we felt that there was some salvation in that we would then come back to the General Assembly in a couple of years and say we are confident that the cost of an average industrial arts program is X dollars. Currently, we are hard pressed to make that kind of statement although the policy makers expect us to be able to.

The current process that we're going through in our office by acting as an agent, as you know, for the Commission on General Education, is that we are trying to purify language and we are rapidly approaching the point of establishing forms for accounting purposes. At the May General Commission meeting the concept was presented in terms of the language, definitions, etc. We solicited, from the commission, approval to establish two committees which eventually evolved into one committee. We had an initial meeting with the Indiana Association of School Business Officials. We had an initial meeting with the Indiana Association of Public School Superintendents. The next meeting of those two organizations was a united meeting, and the second united meeting is transpiring today in Washington Township where I have to go immediately after this one.

We are struggling to arrive at language that people can understand. Obviously, there's dramatic change involved, and people are hesitant to change in general. So we're attempting not only to generate language that's understandable and comprehensive, but we are also struggling to make it at least as palatable as possible.

A representative from the Board of Accounts has attended all of our meetings, so we are operating in harmony with them. We perceive the situation as being very positive in that school people, for a change, have an opportunity for input into something that affects them, as opposed to the 1968 accounting revision. I am certain that many of you remember that when the 1968 revision went through, the Board of Accounts prescribed it and it served all school corporations and received very little input from them. We had that input this time. We had one-man shops represented. We had large school corporations represented -- including both the superintendent and school business manager. So we are operating in close harmony. The General Commission expects a report on the type of accounting manual to be used by their meeting in July -- that accounting manual will understandably be in draft form. The new accounting system will be implemented on January 1, 1978. So we are operating with a black cloud over our heads as far as time is concerned. We have a very specific time line involved and intend to be on target.

New Budget Forms

The Board of Accounts has prescribed new budget forms one, two, and three. If you're not familiar with the budget forms, budget form one is a summary breakout by detail line of expense of all expenditure catagories. That's the way it was under the one hundred, two hundred, three hundred

series of accounts, and that is the way it will be under the new program chart of accounts. The difference is that under the program chart of accounts it speaks strictly to programs. It starts out with regular instruction. I have copies that I'll pass to you shortly. Form two has no revision on it. Although it carries a revision date of 1977, there is no substantial change in the form itself. Form three is the form which provides the preparer a mechanism with which to calculate real property taxes. On the reverse of form three, the expenses are calculated, the miscellaneous revenue is subtracted from expenses and the bottom line is the amount which the school corporation needs to obtain in property taxes to support the total school program. The change on form three was not very dramatic at all. Previously, on the face of form three was a summary statement of each appropriation. For example, the grand amount that was appropriated for the 100 account, administration; then the grand amount that was appropriated for the 200 account, instruction, and a total of that. The face of form three has been changed to reflect the appropriation by program classification. Essentially that's the only change.

I have a gentleman here who said he came with a clean tablet and empty brief case, and he was hoping to get a lot of handouts. I've got plenty of them. I think I'll start handing those out now.

The first part I would like to talk about is the legal size form. This is the new Budget Form One. This is the form which will be used to prepare the 1978 budget. This form is prescribed by the Board of Accounts. We had no input into it whatsoever. It is at the printer's for school printing and it is available for school people. The primary thing I would like to point out is it is set up by program area. The 10,000 account is instruction.

You may read it at your leisure. It's interesting though. You should take note of the 11,400 subaccount. This subaccount is labeled Vocational Education.

*Question:* While you're on program areas, what was the rationale behind the breakout on vocational education and not in elementary and secondary?

*Answer:* The rationale was that the state of Indiana is currently funding schools on the basis of weighted students participating in the vocational/special education areas. Consequently, it was felt that you and I should be able to change the expenditure data format to reinforce the weights or for augmenting change in the weights.

If the weights are not beneficial because they are totally out of line with what is reality, we have some basis then for coming back and saying they are out of kilter, please adjust, as opposed to saying, "Well, we think we have a problem in the grand area of vocational education, but we couldn't pinpoint it."

But if the local school corporation desires a further breakdown in the secondary education -- high school program area, the middle school -- junior high school program area or the elementary area, they may do so at their discretion. Many school corporations break this down by building, by classroom in the building. There are unlimited kinds of different alternatives one may select to provide further detail.

*Question:* Is this finalized or will there be an adjustment for the 1978 year?

*Answer:* It is finalized.

*Question:* I noticed that right now we're working on the state plan for vocational education. Cooperative education, I see, is broken out here.

*Answer:* If you obtain some of the budget worksheets that we put out or if you go back and look at the laws, as far as additional pupil count, each of the classifications presented not only under vocational education, but also special programs follow related programs that we reimburse on.

So it's possible for a local corporation to further refine the accounting system to generate the data they would like to have relative to an individual building, relative to an individual grade level, relative to an individual contact area, above and beyond what you find on this form. This form is locked in for this year. Now there are some things we have problems with on it. There are printing problems on it. For example, in the maintenance area, the operations and maintenance of plant sciences which is on page three, account 25,400, the account title might lead one to believe that it referred to operations of the plant only when the original form went to the printers. So if you see one of these and that looks strange, that's the reason it looks strange. We're bringing that to everyone's attention. So this is what the school board, superintendent, or business manager will utilize in budget preparation for the calendar 1978 budget. In our current committee work, we are attempting to form a description of each program area.

Classification of Programs

The short sheet you have is printed primarily at the top. Let's go to that next. I think that will help clarify some things. We're really talking about two separate items. One item is the program. A program is an instructional or supportive activity area which a school corporation uses to fulfill its function under the laws of Indiana. They are identified for you --

Instruction, Support Services, Community Services, Non-Program Charges, and Debt Services. Those you will be able to tie back to Budget Form One. The 10,000 series on Budget Form One is Instruction. The 20,000 is Support Services, and it follows that format throughout. These serve as major classifications.

The other element of this system addresses what you buy with the money that you have listed in a program area. This is where we get into the notion of objects of expense. You buy several things. You buy salaries, you buy employee benefits, you buy contracted services, you buy supplies and materials. You may or may not apply each object to each program. Some programs don't lend themselves to each individual object.

The handout headed "Programs" with the caption "Preliminary and Tentative, for Discussion Purposes Only" -- meaning not written concretely -- is an outgrowth of the joint superintendent-business manager's committee. They are meeting today (June 9) at which time it may be revised and purified further. But there are definitions given to each of the program areas, so it is easy to go right on through. In other words, what is instruction? There is a definition provided. Within each of the major program areas, a definition is provided for each line on Budget Form One. Go through that now, take a look and see if you have any questions. Some of this is undoubtedly new to you; you have not seen it before. As a matter of fact, this is the first education group, other than the subcommittees, that has seen this. I'm sure most of you have seen the Manual for Public School Accounting in the State of Indiana as prescribed by the Board of Accounts. This document serves as a replacement for the expenditure chart accounts in that manual. Let me make one other point. Do you get bottled up in the

numbering system? The numbering system is an expeditor. That's all it is. Many people really get hung up on whether there are five numbers, nine numbers, ten numbers, or whatever. Don't get bottled up on that. The only purpose of that is to assist in coding, expediting, and defining a particular item. We feel one time through this coding will be sufficient, it'll be old stuff after that.

*Question:* It would appear to me that in the summer school program there has been a minimizing of the vocational concept that seems to be predominant in the regular program, yet many of us do offer summer school vocational programs. The question would be *why* is it important for nine months but not for three or two? Or is it supposed to be broken out separately just in the 1,400 summer school account if you offer vocational programs in the summer?

*Answer:* This statement came from one senator and one representative: We are dispensing money for these reasons for regular school instruction, we want to know what it's costing regular school instruction. See, we don't reimburse you for summer vocational programs on a weighted basis. We do reimburse your regular school vocational programs prorated on a weighted basis. Now you could argue with me as to whether you realize the money from that on the ledger side. And I would be hard pressed to provide a counter argument, because I can't. You can show on the chalk board just as easily as I can how that gets lost some place, particularly for a guaranteed corporation; or appears to be lost. We usually contend that it is not lost, but the common feeling is that it is lost. But at any rate, the rationale was that the State of Indiana would reimburse

on the basis of weighted students in these classifications and your pro-rated reimbursement should be broken out by these classifications.

*Question:* What percentage of the schools will be in with you?

*Answer:* We have 304 operating school corporations in the State of Indiana. Based on our estimates, there will be 300 guaranteed corporations in Indiana in 1978. Four operating school corporations will not fall under the guarantee. They are township schools.

There are some assumptions we had built on that. For example, we had to estimate on an individual basis what vocational enrollments would be for this Fall. We had to estimate on an individual basis like data for special education, like for regular school. So, although we may have had some shakey input, it is the best we could generate at the time. We're confident the number of guaranteed corporations is going to be quite high.

Objects of Expenditures

The color sheet you have is a listing of the objects of expenses. Once again, the language at the top indicates "Tentative; for General Commission Approval." Presented on these pages are the various objects of expense. In other words, what you buy for a given program. It carries a similar kind of numerical classification. Definitions are provided. The committee with which I am working is currently in the process of refining this document also. Our perception is that at such time as the budget is prepared by the central office, the budget preparer has talked to people outside the office. In other words, the central office has come to your shop and said, "What do you think"? We assume they will continue to do that.

Possibly, they will not do that. But it's our perception that ideally the central office will sit down, say in March or February, and there will be a meeting of the minds in the various areas of the educational program. An item such as materials and supplies, possibly, items such as capital outlays -- probably not salaries because salaries are set at various specific times by other concerned parties -- but input hopefully, will be solicited from the area directors relative to the concerned area by object of expense. That means they will be funneled into a given program. And the object will, eventually, end up in a program, and the program that will be advertised for budget purposes. So in case you try to fit together how the thing works, or how we think it might survive, you're looking at a different kind of language, probably, than you've been confronted with before. It's not earthshaking. It will, however, cause your thinking to be framed just a little differently.

Description of Budget Accounts

Most of the reporting we require that is not directly reflected in some kind of reimbursement is in support of reports we must provide to Washington, D.C. At this time we are thinking in terms of soliciting reports from, not only school corporations, but also from various vocational schools -- LEA's -- for a particular vocational program so we will have comprehensive, statewide data relative to a particular given area of expense. For example, we will solicit on form 9A or 9B or some given form irrespective of the number, what was expended for a given time frame, after the fact. We don't collect any of this data before the fact because that would cause problems. What we need to know is what in fact was expended for agriculture A and what in fact was expended for agriculture B and all other programs. We can determine the enrollment by asking local officials and go from there on a statewide basis

to say to them that it is costing an average number of dollars for a given program in the state.

*Comment:* In that light, I hope that when you do this you'll look at statistics that have already been given, so that we don't have to duplicate them.

*Response:* The Feds require reports on a fiscal year. The General Assembly, more so this session than any other session, came down and said, "We don't care about a fiscal year; we want to know about a calendar year." So this is the kind of situation that we're confronted with.

*Comment:* One problem you may come upon in that situation is the difference of the types of instruction in a given program, amounts of equipment in a given program. For comparison purposes, I think it would be rather difficult unless you did catagorize certain levels.

*Response:* In our office we are not hung up on comparisons at all. But we need to be able to sit down and look at a particular weighted program area and say, "That weight isn't getting the job done as far as what it's costing to provide that kind of particular educational experience for a student", or "The weight is appropriate."

*Comment:* It might in one area but it might not in another area on the same program.

*Response:* On a statewide basis, we can make those kinds of assumptions. We're not interested in comparing your corporation with another. Because of the kinds of calls we have for data are such as "What does it cost on a statewide basis for industrial education A?" And then we can go ahead and say "It's costing this." The weight is supposed to reflect the additional cost of providing that area of instruction, and

in fact it does or doesn't even come close. We would be very hard pressed to make that kind of statement now.

*Comment:* I think you're implying that had you this kind of information when the legislature was in session, you might have been more successful in funding some programs. Are you saying this?

*Response:* A little bit of both. Don worked very closely in the 1975 session. And, Don Gentry, I think that it is a fair assessment. Had we had this kind of data in this format, we could have done a better job then.

*Dr. Don Gentry:* I think that when we established the weights, even though we used the best data we had, that there was a lot of scepticism. And I got a lot of questions this session on whether the weights were really true. We kept telling them to forget about the weights. We have to get to a point where we are going to look at the weights.

*Comment/ Question:* There's a couple of things that concern me about the collection and utilization of any information. Number one is the opportunity to standardize the collection, and number two is the misuse of the information. For example, if we could compare the cost, as you have it in this outline, with programs in a comprehensive high school in the same area, you would not have the same cost assessed to that program as you would if it were in an area vocational school because the operational cost, the acquisition cost of land or whatever might be assessed to that area program is on a per student basis. Therefore, somebody may make a quick comparison and say comprehensive programs really cost much less. They really don't. You just haven't had to, in the budget, assess all the costs. So, all I'm saying is that as you gather this information, don't let it be misused or

it can work to the disservice of vocational education instead of the service.

*Response:* The assumption in our office is that any data that is collected is public record. We can't fight that. That's the law of the land. Whenever an individual comes to us and solicits data, typically the first question we ask them is what is their purpose, or language to that effect. We fight the overkill problem. A guy walks in and says, "I want to know everything you can tell me about the State of Indiana and other schools." Then you respond and say, "Well what do you really want to know?" Sometimes the data goes and we don't have the opportunity to ask that question. We can't handle that any better than you can handle it at your level. The school board comes to you and says that we want to know about this. You give them a report and don't ask questions. There's nothing you can do to interfere with that at all.

*Comment:* Two things. I think that you very quickly went over the fiscal year versus the calendar year. That's going to be with us as long as we have federal government in a fiscal year. In our office, part of the data that we collect almost daily . . . we're going to have to develop a new data system at the same time everyone else is. Now my question: we used to have a vocational fund in the area vocational schools that are fiscal agents. Now I assume from your response awhile ago that the ones that are special education, cooperative, and vocational education will have a different account as though they were separate school systems.

*Response:* That is correct.

*Comment/ Question:* Will we get the same thing for an area vocational school where that school is the vocational school for every school in their area? Will they have a separate one for every school, or will they all be in the parent school corporation?

*Response:* It will be segregated. We sent out to all superintendents recently a summary of conversion charts. By way of Dr. Brici, you should have received them. The first page had a description of budgeting accounts, and we addressed the question of LEA's.

Conclusion

In closing, two important points need be made: first, the materials presented here today reflect a different way of budgeting and accounting for revenue and expenditures. The overall difference is in format. In other words, changes in the numbering system and the definitions. The principles of budgeting and accounting have not changed. In the budget scheme, your needs as an area vocational school may be lumped into the transfer account of the participating school corporations. At your building level though, you will be budgeting by object and program.

Secondly, this accounting system will not solve all problems for all people. In other words, we probably will not arrive at a finite "cost" for "agriculture A", or "B". However, we will be much closer to that cost under this new format than we were under the old chart of accounts. Clearly the only way, it seems to me, to arrive at a finite cost would be to activate an accrual accounting base and nail down quite tightly a uniform chart of accounts for all 304 operating school corporations. The accrual accounting question has been argued in this state for several years without resolution. The

chart of accounts we have under the program structure is a step in the direction of getting a better handle on costs than anything we've previously had. Although this new system does not yet have the absolutes for clear cost identification, we are moving toward that focal point.

## Determination of Vocational Program Objectives and Target Goals: Group Workshop (1)

Lee Thompson talked about the need for goal setting and provided a guide to help determine program target goals and output measures. Then each small group worked on the determination of program target goals according to the guide. Mr. Thompson's remarks were based in part on material to be found in the Administrator's Manual. They have been rewritten and edited for this report.

### The Need for Goal-Setting and Guide

Many vocational programs have been evaluated in the past on the basis of such subjective qualities as students' morale, activity, discipline, the instructors' personalities and qualifications, and the program's return on investment. An evaluation of the effectiveness of a vocational program using but one of these variables would be useless to the student, the community and the instructor. Even an evaluation using them all might be insufficient in light of today's demands for accountability and pressures from the public. Furthermore, the use of subjective forms of evaluation may provide little assurance that students' interests and community needs are being met. A more objective means of assessment is needed.

The cost-effectiveness analysis system is a tool for meeting these needs by producing objective supports that will stand up under the demands for

accountability to the community and student needs. Prior to the cost-effectiveness measurement, a working knowledge of goal setting and assessment is necessary. Why goals? It has been said that little is denied to well directed labor and little is attained without it. Without objectives any task is made unnecessarily difficult, if not impossible. They help prevent one's being led astray by the details and problems of the moment. Good goals provide three qualities -- scope, definiteness, and direction -- needed in determining program effectiveness. By scope we mean that success is defined in measurable terms. Making these terms clear to all parties gives them definiteness. Finally, a good goal keeps all headed in the same direction.

Vocational administrators should set up goals for their vocational programs at the beginning of a school year and assess how well the goals have been achieved at the conclusion of the school year. You may raise a question of how to do it. Here is a guide to help you determine program goals. The seven categories of program objectives and target goal statements are contained in the cost-effectiveness analysis system (see Appendix A). The procedures to be performed in goal-setting and outcome assessment are outlined in the Administrator's Manual (Kim, Harris, and Ruby, 1976, pp. 37 & 39).

4.1 Define program objectives and target goals.

> Program objectives should be reviewed and specified into measurable terms. The following procedures can be taken into consideration:
>
> Refer to the seven-category objectives of the program and their specifications. A set of program objectives are developed for determination of specified target goals of the vocational program.
>
> Select a number of objectives and specifications. Considering the program relativeness and data avail-

ability, a number of objectives and specifications can be selected from among the seven categories. For instance, Objective 2 will be appropriate to the program enrolling students with special needs. Specified goals within an objective category may be chosen according to policy preferences or data availability.

Explore or set forth target goals. Already assigned target goals can be identified. Otherwise, appropriate target goals should be set forth by the authority from the future perspective, based upon Appendix D.

Put determined program objectives/target goals into FORM 4.1.

4.2 Collect program output data including follow-up information and identify output measures.

In accordance with program objectives, program output data should be collected to identify actual performances of each objective. That is the extent to which target goals are achieved when completing the vocational program or after graduation. For program planning, however, anticipated target goals can be referred to as outputs of the program objective. In relation to the selected predetermined target goals, collect needed data through:

1. School records/documents analysis, and
2. Follow-up information

Identify program output measures. For example, a completion rate of students will be made by dividing the number of students who completed the vocational program over the number of students enrolled in the program.

Put output information into FORM 4.2. Then, it is ready to compute program effectiveness scores. It may proceed or wait until cost analysis.

Group Workshop (1)

The participants were instructed to follow the above procedures in determining program target goals for each of four vocational programs, one of which was assigned to each small group. In the workshop, each group

TABLE II

HIGH SCHOOL CORPORATION (9-12th) INFORMATION:
HYPOTHETICAL DATA

| | | |
|---|---|---|
| Full-time equivalent teachers: | | 40 |
| Average daily membership (ADM): | | 600 |
| Male | 350 | |
| Female | 250 | |
| Disadvantaged | 120 | |
| Handicapped | 30 | |
| Vocational programs: | | |
| Auto body | 50 | |
| Data processing | 30 | |
| Horticulture | 40 | |
| Health occupation | 60 | |
| Number of school days: | | 180 |
| Hours per school day: | | 3 |
| Vocational teachers (FTE): | | 4 |
| Total school building: | | 35,000 Sq. Ft. |
| Instructional space for vocational programs: | | 9,000 Sq. Ft. |
| Original building cost: | | $2,000,000 |

selected a number of target goals from the Program Objectives and Target Goal Statements (see Appendix A) and determined, through the discussion, measurable levels for each using the given high school corporation information as shown in Table II. They were reminded to consider the community background and the characteristics of students to be enrolled in the vocational program. The target goals for vocational programs determined by each group are shown in Table III.

## Analysis of Vocational Program Costs: Group Workshop (2)

Don Pennington presented the program cost analysis scheme and guide as developed in the cost-effectiveness analysis system. Then each small group worked on the analysis of program costs using the cost data form provided.

### Program Cost Analysis Scheme and Guide

Vocational administrators are presently carrying out most of the activities advocated by the cost-effectiveness analysis system. Either formally or informally they have been establishing objectives, keeping track of costs, and to some extent tying costs back to objectives. The system is nothing more than a means for tying objectives and outputs to costs.

As Dr. Gentry suggested, the participants should concentrate on management of expenditures rather than on securing more funds. According to the cost-effectiveness analysis system, expenditures for operating vocational programs are divided into two categories -- direct costs and indirect costs. The total cost of a given instructional program is composed of direct costs plus prorated indirect costs.

TABLE III

SELECTED TARGET GOALS DETERMINED BY EACH GROUP

| Group/Program | Code | Target Goal |
|---|---|---|
| Group A: Auto Body | 1-b. | 80 percent of the enrolled students will complete the program requirements. |
| | 2-b. | 20 percent of the disadvantaged students will be enrolled in the vocational program. |
| | 3-a. | 75 percent of the students who have sought and are available for employment will be employed full-time. |
| | 3-g. | 85 percent of the students employed will indicate that their job skill was adequately taught. |
| | 5-c. | 90 percent of the students will judge career guidance and counseling services adequate. |
| | 6-a. | 70 percent of the student completions will be working in the employment community serviced by the school corporation. |
| | 7-d. | 20 percent of the students who complete the vocational program will be enrolled in the advanced study programs. |
| Group B: Data Processing | 1-a. | 5 percent of the student population will be enrolled in the vocational program. |
| | 2-g. | 20 percent of the students enrolled will represent the minority sex. |
| | 3-c. | 20 percent of the graduates available for employment and having sought employment will be employed in their specialized area. |

TABLE III, continued

| Group/Program | Code | Target Goal |
|---|---|---|
| | 4-a. | 70 percent of the students enrolled in the vocational programs will be active in the youth organization. |
| | 5-a. | 30 percent of the students will utilize career counseling and guidance services. |
| | 6-a. | 20 percent of the student completions will be working in the employment community serviced by the school corporation. |
| | 7-d. | 80 percent of the students enrolled in advanced study programs will rate their secondary vocational program as instrumental in their decision to continue their education. |
| Group C: Horticulture | 1-a. | 7 percent of the student population will be enrolled in the vocational program. |
| | 1-f. | 100 percent of the student completions will indicate they would recommend their program to other students. |
| | 2-g. | 25 percent of the students enrolled will represent the minority sex. |
| | 3-a. | 52 percent of the students who have sought and are available for employment will be employed full-time. |
| | 3-f. | 60 percent of the students responding on a follow-up study will indicate they are satisfied with their jobs. |
| | 4-a. | 80 percent of the students enrolled in the vocational program will be active in the youth organization. |
| | 5-c. | 60 percent of the students will judge career guidance and counseling services adequate after completion of their vocational program. |

TABLE III, continued

| Group/Program | Code | Target Goal |
|---|---|---|
| Group D: Health Occupations | 1-b. | 90 percent of the students will complete the program requirements. |
| | 1-f. | 70 percent of the student completions will indicate they would recommend their vocational program to other students. |
| | 2-g. | 10 percent of students enrolled will represent the minority sex. |
| | 3-b. | 80 percent of the graduates who have sought and are available for employment will be employed in their specialized area. |
| | 4-a. | 100 percent of the students enrolled in the vocational program will be active in the youth organization. |
| | 6-a. | 60 percent of the student completions will be working in the employment community serviced by the school corporation. |
| | 7-a. | 70 percent of the students who completed the vocational program will be enrolled in advanced study. |

The direct costs represent expenditures directly related to the instructional program or those that are quickly assignable to the instructional program. Examples given are salaries, fringe benefits, and supplies. Indirect costs are those costs that cannot be directly assigned and must be prorated, unless each laboratory is metered for utilities. Examples of such costs are student support services, guidance, counseling, statistical services, administration, and utilities. The cost-effectiveness analysis system demonstrates several different methods of assigning indirect costs to the instructional programs. It shows preferred and alternative methods of prorating the different costs. These are average daily membership, full-time teacher equivalent, instructional hours, square foot of floor space, and time of use. Each of the instruments designed for analyzing program costs appears in Appendix C of the Administrator's Manual.

A guide to collecting program cost data appears in the Administrator's Manual (Kim, et al., 1976, p. 41) as follows:

> 4.3 Collect program cost data for instruction and supporting services.
>
> Assign the following item costs to a program and add them to be a direct cost for instruction.
>
> (1) Salaries of teaching staff
> (2) Fringe benefits
> (3) Travel costs
> (4) Supplies and materials
> (5) Replacement of instructional equipment
> (6) Building use for instruction
>
> Prorate current expenditures for the following supporting services to a program by using appropriate allocation bases.
>
> (1) Student services
> (2) Teaching staff services
> (3) School administration

TABLE IV

PROGRAM COST ANALYSIS FORM: HYPOTHETICAL DATA

| | Auto Body | Data Processing | Horti-culture | Health Occupations |
|---|---|---|---|---|
| 1. Salaries for instructional staff ($) | 15,000 | 11,500 | 14,500 | 11,000 |
| 2. Fringe benefits ($) | 250 | 250 | 250 | 250 |
| 3. Travel costs ($) | 100 | 300 | 600 | 300 |
| 4. Supplies and materials ($) | 1,000 | 1,500 | 1,500 | 500 |
| 5. Costs of equipment and furniture ($) | 2,300 | 600 | 2,000 | 14,500 |
| 6. Building use costs ($) | | | | |
| a. Instructional space for vocational programs (sq. ft.) | 4,000 | 1,500 | 2,000 | 1,500 |
| b. Total building space (sq. ft.) | ----------35,000---------- | | | |
| c. % instructional space for vocational programs (a ÷ b) | _____ | _____ | _____ | _____ |
| d. % time in use for vocational programs | 540/1080 | 540/1080 | 540/1080 | 540/1080 |
| e. Time/floor unit (c x d) | _____ | _____ | _____ | _____ |
| f. Original building cost ($) | ----------2,000,000---------- | | | |
| g. Life expectancy (years) | ----------40---------- | | | |
| h. Total annual depreciated costs ($) | ----------50,000---------- | | | |
| i. Annual depreciated costs for vocational programs (h x e) | _____ | _____ | _____ | _____ |

TABLE IV, continued

| | Auto Body | Data Processing | Horti-culture | Health Occupations |
|---|---|---|---|---|
| 7. Direct costs - total ($) (1+2+3+4+5+6i) | _____ | _____ | _____ | _____ |
| 8. Student support services total costs ($) | ----------14,000---------- | | | |
| 9. Average daily membership for vocational programs over total ADM | 50/600 | 30/600 | 40/600 | 60/600 |
| 10. Student service costs for vocational programs (8 x 9) | _____ | _____ | _____ | _____ |
| 11. Instructional staff support service total ($) | ----------12,000---------- | | | |
| 12. FTE teachers for vocational programs over total school FTE | 1/40 | 1/40 | 1/40 | 1/40 |
| 13. Instructional staff service costs for vocational programs ($) (11 x 12) | _____ | _____ | _____ | _____ |
| 14. Central administration support service total costs ($) | ----------29,000---------- | | | |
| 15. Central administration support service costs for vocational programs (14 x 9) | _____ | _____ | _____ | _____ |
| 16. School administration support service total costs ($) | ----------26,000---------- | | | |
| 17. School administration support service costs for vocational programs (16 x 9) | _____ | _____ | _____ | _____ |

TABLE IV, continued

| | | Auto Body | Data Processing | Horti-culture | Health Occupations |
|---|---|---|---|---|---|
| 18. | Plant operation and maintenance total costs ($) | | | 46,000 | |
| 19. | Plant operation and maintenance costs for vocational programs (18 x 6e) | | | | |
| 20. | Central support service total costs ($) | | | 600 | |
| 21. | Central support service costs for vocational programs (20 x 12) | | | | |
| 22. | Indirect support costs (10+13+15+17+19+21) | | | | |
| 23. | Total costs (7 + 22) | | | | |
| 24. | Number of enrollments | 50 | 30 | 40 | 60 |
| 25. | Program cost per enrollment (23 ÷ 24) | | | | |
| 26. | Average program or budgeted costs ($) | 650 | 710 | 600 | 550 |
| 27. | Cost efficiency index (25 ÷ 26) | | | | |

(4) General administration
(5) Business services
(6) Central services

Identify a total cost of a program.

A total cost of a program is direct costs plus indirect costs prorated to the vocational program.

Group Workshop (2)

For the workshop the project staff prepared a program cost analysis form with hypothetical data (see Table IV). Each group worked on the computation of the assigned program costs. They calculated the amounts of cost items to determine the direct and indirect costs. Going a step further, they computed program cost per enrollment by dividing the total cost by the number of enrollments. The cost efficiency index was computed by dividing the actual program cost by the (given) average or budgeted program cost. The final results are summarized in Table V.

TABLE V

ANALYSIS OF PROGRAM COSTS USING HYPOTHETICAL DATA

| | Auto Body | Data Processing | Horti-culture | Health Occupations |
|---|---|---|---|---|
| Total Costs | $29,765 | $19,835 | $26,668 | $35,685 |
| Direct Costs | 21,400 | 15,150 | 20,350 | 27,550 |
| Indirect Costs | 8,365 | 4,685 | 6,318 | 8,135 |
| Unit Cost/Enrollment | 595 | 661 | 666 | 595 |
| Average Unit Cost | 650 | 710 | 600 | 550 |
| Cost Efficiency Index | .92 | .93 | 1.11 | 1.08 |

## Computation of Cost-Effectiveness Measures: Group Workshop (3)

Jin Eun Kim explained the formulas and procedures for computing three kinds of cost-effectiveness measures. Then the workshop participants practiced the computation of cost-effectiveness measures.

### Cost-Effectiveness Measures and Guide

Program effectiveness measures, cost efficiency measures, and a cost-effectiveness ratio and/or performance ratio can be computed using the formulas developed in the cost-effectiveness analysis system (see Chapter II, pp. 10-13).

Program effectiveness scores can be measured by the degree of goal attainments and can be combined into an effectiveness index. Cost efficiency is a function of the unit cost for a vocational program. It also can be indexed as a ratio of actual unit cost to average or budgeted unit cost. Based on the measures of program effectiveness and cost efficiency, a cost-effectiveness ratio and performance ratio can be computed.

A guide to computing these cost-effectiveness measures is found in the Administrator's Manual (Kim, et al., 1976, pp. 43-48).

5.1 Compute program effectiveness measures for vocational programs.

Compute effectiveness score(s) for a program.

The program effectiveness score is expressed in percent of goal attainment by relating output to goal.

Draw program effectiveness indices.

(1) Composite program effectiveness index by adding all effectiveness scores.

TABLE VI

ILLUSTRATED ACTUAL PROGRAM OUTPUTS

| Objectives | Auto Body | Data Processing | Horticulture | Health Occupations |
|---|---|---|---|---|
| 1-a | 12% | 5% | 8% | 10% |
| 1-b | 45% | 40% | 30% | 50% |
| 1-c | 60% | 70% | 40% | 90% |
| 1-d | 5% | 2% | 3% | 6% |
| 1-e | 70% | 50% | 60% | 70% |
| 1-f | 85% | 80% | 85% | 80% |
| 2-a | 5% | --- | 10% | --- |
| 2-b | 25% | 15% | 20% | 25% |
| 2-c | 12 | 8 | 10 | 12 |
| 2-d | 12 | 8 | 10 | 12 |
| 2-e | 3 | --- | 5 | --- |
| 2-f | 3 | 10 | 5 | 15 |
| 2-g | 10% | 15% | 20% | 10% |
| 2-h | 80% | --- | 85% | --- |
| 2-i | 40% | --- | 45% | --- |
| 2-j | 80% | --- | 80% | --- |
| 2-k | 70% | --- | 70% | --- |
| 3-a | 80% | 80% | 75% | 90% |
| 3-b | 70% | 60% | 60% | 90% |
| 3-c | 10% | 20% | 15% | --- |
| 3-d | 25% | 30% | 25% | 30% |
| 3-e | --- | --- | --- | --- |
| 3-f | 70% | 70% | 60% | 70% |
| 3-g | 70% | 70% | 60% | 70% |
| 3-h | 60% | 60% | 50% | 60% |
| 4-a | 60% | 75% | 90% | 80% |
| 4-b | 50% | 60% | 80% | 70% |
| 5-a | 40 | 25 | 40 | 50 |
| 5-b | 40 | 30 | 40 | 50 |
| 5-c | 50% | 60% | 50% | 60% |
| 5-d | 50% | 60% | 50% | 60% |

TABLE VI, continued

| Objectives | Auto Body | Data Processing | Horticulture | Health Occupations |
|---|---|---|---|---|
| 6-a | 60% | 50% | 50% | 70% |
| 6-b | 40% | 50% | 50% | 30% |
| 6-c | 30% | 18% | 20% | 30% |
| 6-d | 10 | 5 | 10 | 20 |
| 6-e | 8 | 4 | 7 | 10 |
| 6-f | 8 | 4 | 7 | 10 |
| 6-g | 8 | 4 | 7 | 10 |
| 6-h | 8 | 4 | 7 | 10 |
| 7-a | 20% | 20% | 25% | 50% |
| 7-b | 70% | 80% | 90% | 90% |
| 7-c | 30% | 20% | 10% | 10% |
| 7-d | 70% | 75% | 90% | 90% |
| 7-e | 60% | 60% | 70% | 70% |

(2) Average program effectiveness index by dividing the composite index by the number of scores.

(3) Weight composite program effectiveness index by adding weighted effectiveness scores according to the degree of importance or policy preferences.

(4) Weight average program effectiveness index by dividing the weighted composite index by the number of weighting points.

5.2 Compute cost efficiency measures for vocational programs.

Compute unit costs for a program.

Total program costs divided by units of program outputs (enrollment, contact hours, and completion).

Compute cost efficiency index.

Actual unit cost divided by average or budgeted unit cost.

5.3 Compute a cost-effectiveness ratio and performance ratio for vocational programs.

Draw a cost-effectiveness ratio.

A ratio of average program effectiveness index to actual unit cost.

Draw a performance ratio.

A ratio of average program effectiveness index to cost efficiency index.

Group Workshop (3)

In this workshop, illustrated actual program output data for each vocational program was provided (see Table VI). Using this program output data and the previously determined program target goals and analyzed program costs, group members computed cost-effectiveness measures for the vocational program assigned to their group.

TABLE VII

PROGRAM EFFECTIVENESS AND WEIGHTED SCORES

| Program | Code | Target Goal | Actual Output | Effect. Score | Weight Points | Weighted Score |
|---|---|---|---|---|---|---|
| Auto Body | 1-b | 80% | 45% | 56% | 6 | 336 |
| | 2-b | 20% | 25% | 125% | 6 | |
| | 3-a | 75% | 80% | 107% | 4 | 750 |
| | 3-g | 85% | 70% | 82% | 4 | 328 |
| | 5-c | 90% | 50% | 56% | 2 | 112 |
| | 6-a | 70% | 60% | 88% | 7 | 616 |
| | 7-a | 20% | 20% | 100% | 1 | 100 |
| Data Processing | 1-a | 5% | 5% | 100% | 6 | 600 |
| | 2-g | 20% | 15% | 75% | 6 | 450 |
| | 3-c | 20% | 20% | 100% | 5 | 500 |
| | 4-a | 70% | 75% | 107% | 2 | 214 |
| | 5-a | 30 | 25 | 83% | 4 | 332 |
| | 6-c | 20% | 18% | 90% | 7 | 630 |
| | 7-d | 80% | 75% | 94% | 1 | 94 |
| Horticulture | 1-a | 7% | 8% | 114% | 10 | 1140 |
| | 1-f | 100% | 85% | 85% | 10 | 850 |
| | 2-g | 25% | 20% | 80% | 10 | 800 |
| | 3-a | 52% | 75% | 144% | 5 | 720 |
| | 3-f | 60% | 60% | 100% | 5 | 500 |
| | 4-a | 80% | 90% | 113% | 5 | 565 |
| | 5-c | 60% | 50% | 8?% | 5 | 415 |
| Health Occupations | 1-b | 90% | 50% | 56% | 10 | 560 |
| | 1-f | 70% | 80% | 114% | 10 | 1140 |
| | 2-g | 10% | 10% | 100% | 10 | 1000 |
| | 3-b | 80% | 90% | 113% | 5 | 565 |
| | 4-a | 100% | 80% | 80% | 5 | 400 |
| | 6-a | 60% | 70% | 117% | 15 | 1755 |
| | 7-a | 70% | 50% | 71% | 5 | 355 |

Program Effectiveness. Each group computed their program's effectiveness scores by dividing actual output indicators by predetermined target goals (see Table III), and weighted each score in terms of the importance of each goal. The results are shown in Table VII. For instance, auto body program effectiveness scores are 56%, 125%, 107%, 82%, 56%, 88%, 100% for each goal respectively. Each program effectiveness score is multiplied by the weighting points based on importance order and the weighted score of each goal is produced.

Group members also computed program effectiveness indices. The Composite Program Effectiveness (CPE) index was the sum of all effectiveness scores, and the Average Program Effectiveness (APE) index was computed by dividing the CPE index by the number of effectiveness scores. The weighted Composite Program Effectiveness (WCPE) index was the sum of all weighted program effectiveness scores. Average Weighted Program Effectiveness (AWPE) index was derived by dividing the WCPE index by the total of weighting points given to each effectiveness score. The program effectiveness indices are shown in Table VIII.

TABLE VIII

PROGRAM EFFECTIVENESS INDICES

| | Index | | | |
|---|---|---|---|---|
| Program | CPE | APE | WCPE | AWPE |
| Auto Body | 614 | 88 | 2242 | 75 |
| Data Processing | 649 | 93 | 2820 | 91 |
| Horticulture | 719 | 103 | 2990 | 100 |
| Health Occupations | 651 | 93 | 5775 | 96 |

Cost Efficiency. For analyzing program costs, a cost efficiency index (CEI) was computed by dividing actual unit cost by the average or budgeted unit cost. The results are shown in Table IV.

Cost-Effectiveness Ratio and Performance Ratio. Group members computed a cost-effectiveness ratio (C-ER) by dividing the Average Program Effectiveness (APE) index by the unit cost per enrollment, and computed a Performance Ratio (PR) by dividing the Average Program Effectiveness (APE) index by Cost Efficiency (CEI). The resulting C-ER and PR for each vocational program are shown in Table IX.

TABLE IX

COST-EFFECTIVENESS RATIO AND PERFORMANCE RATIO FOR VOCATIONAL PROGRAMS

| Program | C-ER | PR |
|---|---|---|
| Auto Body | .148 | 95.65 |
| Data Processing | .141 | 100.00 |
| Horticulture | .155 | 92.79 |
| Health Occupations | .156 | 86.11 |

## Group Presentations and Interpretation of the Cost-Effectiveness Measures

After the small group workshop sessions, each group presented the cost-effectiveness measures for their vocational program and interpreted the results.

## Group Presentations

Each group demonstrated how to determine the program target goals, how to analyze the program cost, and how to compute the cost-effectiveness measures based on the hypothetical data for their program. The three kinds of cost-effectiveness measures for vocational programs are summarized in Table X.

TABLE X

A SUMMARY OF GROUP PRESENTATIONS

| C-E Measures | Auto Body | Data Processing | Horti-culture | Health Occupations |
|---|---|---|---|---|
| Program Effectiveness | | | | |
| APE | 88 | 93 | 103 | 93 |
| AWPE | 75 | 91 | 100 | 96 |
| Cost Efficiency | | | | |
| Unit Cost | 595 | 661 | 666 | 595 |
| Cost Efficiency Index | .92 | .93 | 1.11 | 1.08 |
| Cost Effectiveness and Performance Ratio | | | | |
| C-E Ratio | .148 | .141 | .155 | .156 |
| Performance Ratio | 86.65 | 100.00 | 92.79 | 86.11 |

## Interpretation of the Results

Throughout the computation of cost-effectiveness measures using the hypothetical data, participants were asked to consider three questions: (1) Which program is most effective? (2) Which program is most efficient? and (3) Which program best joins efficiency and effectiveness?

Referring to the program effectiveness index, the horticulture program is the most effective of the four programs, whereas the auto body program is the most efficient on the basis of the cost efficiency index. According to the performance ratio, the data processing program is the most effective and efficient. Thus, these three kinds of measures can be utilized as criteria in evaluating the degrees of effectiveness, efficiency, and performance of vocational programs.

Prior to judgment by means of these cost-effectiveness measures, each measure should be carefully interpreted. In interpreting program effectiveness measures, the following points should be taken into consideration:

(1) Were program objectives appropriately selected?
(2) Were target goals adequately determined?
(3) What effectiveness measures may most reliably be used to judge program effectiveness?

The following questions may be used to help interpret cost efficiency measures:

(1) What budget items were included in determining costs for the vocational program?
(2) How were costs assigned or prorated to the program?
(3) What efficiency measures may most reliably be used to judge program efficiency?

A cost-effectiveness ratio and/or performance ratio can be used to judge a program's effectiveness relative to cost efficiency. When comparing two or more programs, the following questions should be kept in mind:

(1) Are effectiveness scores and indices based on the same goal targets in all programs?
(2) Are efficiency measures and indices based on the same cost items in all programs?
(3) Are the students comparable in all programs?

Cost-effectiveness measure computations can help the vocational program administrator to: (1) increase his program's effectiveness using resources at hand, and (2) allocate resources to the most effective and/or efficient programs.

## Conclusions

In closing the workshop, the Project Director made the following remarks:

1. Cost-effectiveness analysis is not a difficult concept, neither is it a simple technique. When we observe the following step-by-step procedures, we can make it a useful management tool:

   a. Set forth program target goals
   b. Assess program outputs
   c. Analyze program costs
   d. Compute program effectiveness measures
   e. Compute cost efficiency measures
   f. Compute cost-effectiveness ratio and/or performance ratio

2. Do the goal setting first; don't try to get the resulting cost-effectiveness measures first. Without goal-setting, you cannot expect results.

3. The resulting cost-effectiveness measures should be used as alternative criteria for evaluating program effectiveness, cost efficiency, and management performance. The measures should not be used as absolutely exclusive criteria in the decision-making process.

4. The cost-effectiveness technique should be used as a self-evaluation approach to help in identifying problems and correcting wrong directions in the operation of vocational programs. Don't try to compare the cost-effectiveness measures of your own program with those of others.

5. Cost-effectiveness analyses should be continuous. Repeated measurement and the accumulation of data will increase the utility of the cost-effectiveness technique.

## Evaluation of the Conference

At the final session, a conference evaluation survey was conducted to measure the participants' understanding of the cost-effectiveness technique, satisfaction with the conference operation, and their perceptions of the cost-effectiveness analysis system. The participants completed the conference evaluation form which is in Appendix C of this report.

Understanding of Cost-Effectiveness Techniques

More than 90 percent of the conference participants were satisfied with the demonstration of the cost-effectiveness techniques. The participants indicated a relatively higher degree of understanding of program target goal determination and program cost analysis than of cost-effectiveness measurement and interpretation of the measures.

The degree of satisfaction is weighted by five, three and one points, and a weighted average point was computed for each technique. The results are shown in Table XI. One finding was that the demonstrations of the cost-effectiveness measurement technique and the results interpretation technique should be improved.

TABLE XI

PARTICIPANTS' UNDERSTANDING OF COST-EFFECTIVENESS TECHNIQUES

| Techniques | Satisfaction (%) Very Satisfied | Partially Satisfied | Dis-Satisfied | Weighted Average Point |
|---|---|---|---|---|
| 1.1 Determination of program objectives and target goals | 65 | 35 | | 4.30 |
| 1.2 Analysis of program costs | 35 | 65 | | 3.70 |
| 1.3 Measurement of cost-effectiveness | 20 | 70 | 10 | 3.20 |
| 1.4 Interpretation of cost-effectiveness measures | 20 | 70 | 10 | 3.20 |

Satisfaction with the Conference Operation

Table XII reveals the degrees of participant satisfaction, in weighted average points, with the conference operation. Most of the participants indicated that they were very satisfied with the opportunity for discussion in the group workshop, with the opportunity for professional development, with the usefulness of materials, and with the conference location and facilities.

TABLE XII

PARTICIPANTS' SATISFACTION WITH THE CONFERENCE OPERATION

| Conference Operation | Satisfaction (%) Very Satisfied | Partially Satisfied | Dis-Satisfied | Weighted Average Point |
|---|---|---|---|---|
| 1.5 Opportunity for discussion at group workshop | 85 | 10 | 5 | 4.60 |
| 1.6 Usefulness of materials | 90 | 10 | | 4.90 |
| 1.7 Opportunity for professional development | 90 | 10 | | 4.90 |
| 1.8 Organization of the conference | 80 | 15 | 5 | 4.50 |
| 1.9 Conference location and facilities | 90 | 10 | | 4.90 |

Needs for Cost-Effectiveness Analysis

The participants perceived a need for cost-effectiveness analysis in operating vocational programs at an average of over four points on a five point scale. They became familiar with the cost-effectiveness concept, found it relevant and likely to be beneficial to them in their school situations; they expressed a general interest in the concept (see Table XIII).

TABLE XIII

NEEDS FOR COST-EFFECTIVENESS ANALYSIS
PERCEIVED BY THE PARTICIPANTS

| Item | Weighted Average Point |
|---|---|
| 2.1 Familiarity with the cost-effectiveness concept | 4.05 |
| 2.2 Relevance of the cost-effectiveness analysis concept | 4.00 |
| 2.3 More knowledge of the cost-effectiveness concept | 4.06 |
| 2.4 Personal interest in the cost-effectiveness analysis concept | 4.40 |
| 2.5 Advantages of the cost-effectiveness instruments and data forms | 4.35 |
| 2.6 Needs for cost-effectiveness analysis in general | 4.10 |

Participants' Attitude Toward the Cost-Effectiveness Analysis System

The participants' attitude toward the cost-effectiveness analysis system was strongly positive. They were willing to recommend the use of the cost-effectiveness analysis system to others and were willing to adopt the system

in their schools. Some participants discounted the value, importance, and benefits of the cost-effectiveness analysis system. Their reactions should be further studied (see Table XIV).

TABLE XIV

PARTICIPANTS' ATTITUDE TOWARD THE COST-EFFECTIVENESS ANALYSIS SYSTEM

| Item | Weighted Average Point |
|---|---|
| 2.7 Willing to recommend the use of the cost-effectiveness analysis system | 4.45 |
| 2.8 Believe cost-effectiveness analysis to improve program management | 4.30 |
| 2.9 Value of the cost-effectiveness analysis system in planning and evaluating vocational programs | 3.95 |
| 2.10 Willing to adopt the cost-effectiveness analysis system | 4.11 |
| 2.11 Importance of the cost-effectiveness analysis system | 3.63 |
| 2.12 Benefits of the cost-effectiveness analysis system | 3.42 |

Attributes of the Cost-Effectiveness Analysis System

Participants recognized that the cost-effectiveness analysis system is consistent with existing values and past experience, and that it can be implemented on a limited basis. However, some participants responded negatively when queried on the feasibility of cost-effectiveness measures. A

substantial number of participants thought the cost-effectiveness analysis system difficult to use (see Table XV).

TABLE XV

ATTRIBUTES OF THE COST-EFFECTIVENESS ANALYSIS SYSTEM PERCEIVED BY THE PARTICIPANTS

| Item | Weighted Average Point |
|---|---|
| 2.13 Consistency of the cost-effectiveness analysis system | 4.00 |
| 2.14 Difficulty to understand and use | 3.35 |
| 2.15 Implementation on a limited basis | 3.80 |
| 2.16 Feasibility of the cost-effectiveness measures | 2.50 |

## Summary

In an effort to disseminate the cost-effectiveness analysis system, a statewide conference was conducted to: (1) increase awareness of the cost-effectiveness analysis system in the PPBS context, (2) improve vocational administrators' analytical techniques, and (3) evaluate the system in terms of its attributes.

At the opening session, William Riley described the new budgeting and accounting system to be adopted by Indiana school corporations. His presentation provided a groundwork for understanding the cost-effectiveness analysis system in the context of the PPB system.

The participants were divided into four small groups and each group was assigned a vocational program to administer. Each group practiced: (1) the determination of program objectives and target goals, (2) the analysis of program costs, and (3) the computation of cost-effectiveness measures using hypothetical data which were provided by the project staff. Results and interpretations were presented and discussed among the groups.

At the final session, the participants evaluated the conference operation and the cost-effectiveness analysis system by completing the conference evaluation form. In general, the conference received strong positive responses from the participants on increasing their understanding of cost-effectiveness techniques and on their attitude toward adoption of the cost-effectiveness analysis system. Some participants considered the system difficult to understand and use and the cost-effectiveness measures unfeasible.

## Chapter V

## CONCLUSIONS

This report summarizes the components of the cost-effectiveness analysis system, among which are a cost-effectiveness analysis model, cost-effectiveness measures and data forms. In an effort to diffuse the system, this project was undertaken to develop a conceptual framework for its diffusion/adoption and to conduct a statewide conference on the new cost-effectiveness analysis techniques for secondary vocational programs.

The conceptual framework includes a recycling process comprised of four major elements: (1) the resource system, (2) educational innovations, (3) the user system, and (4) consequences of educational innovations. The recycling process also includes four major activities: (1) research and development, (2) initiation and decision, (3) implementation and installation, and (4) evaluation and feedback. Diffusion and adoption activities are linked in this model as an interaction process between the resource and user systems.

To diffuse the cost-effectiveness analysis system, the Technical Report and Administrator's Manual were entered in the ERIC system, two papers were published in professional journals, and four related papers were presented at state and national level meetings. Local vocational directors were involved in the development of the cost-effectiveness analysis system and remain involved as linkage continues between the resource and user systems. A statewide conference was convened in the Summer of 1977 to acquaint the administrators with the new system.

The conference was conducted to: (1) increase awareness of the cost-effectiveness analysis system in the PPBS context, (2) improve vocational administrators' analytical techniques, and (3) evaluate the system in terms of its attributes. A total of 30 state and local vocational administrators practiced: (1) the determination of program objectives and target goals, (2) analysis of program costs, and (3) completion of cost-effectiveness measures using hypothetical data. The participants evaluated both the conference operation and the cost-effectiveness analysis system.

The participants thought the conference improved their understanding of cost-effectiveness techniques and their attitude toward adoption of the cost-effectiveness analysis system. Some participants thought the system would be difficult to understand and use and considered the cost-effectiveness measures unfeasible.

In Summary:

1. The development of the cost-effectiveness analysis system is significant not only within the state, but nationwide. There has been widespread demand to improve the cost-effectiveness of vocational programs.

2. The conceptual framework for the diffusion and adoption of the system provides a groundwork both for diffusing R & D products and evaluating their impact on educational change.

3. The cost-effectiveness analysis system has been disseminated nationwide through the ERIC system, mailing, publications, and paper presentations. The system has received recognition from both educational theorists and practitioners.

4. The statewide conference on cost-effectiveness analysis of secondary vocational programs was an essential activity for vocational administrators. It improved their understanding of and their attitudes toward adoption of the system. A similar conference will be necessary for post-secondary vocational administrators within the state.

5. The workshop activities at the statewide conference constitute a prototype for a national priority training workshop on improving the cost-effectiveness of vocational programs.

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# Appendix A

PROGRAM OBJECTIVES AND TARGET GOALS

OBJECTIVE 1. *Aid students enrolled in vocational education to successfully complete a secondary occupational program.*

1-a. _____percent of the student population will be enrolled in the secondary vocational program during the 19__ - 19__ school year.

1-b. _____percent of the students will complete the program requirements.

1-c. _____percent of the student completions will have on-the-job occupational experience.

1-d. _____percent lower dropout rate will occur in the vocational program than the dropout rate for the entire school.

1-e. _____percent of the student completions will rate their program to have satisfactorily met their educational goals.

1-f. _____percent of the student completions will indicate they would recommend their vocational program to other students.

OBJECTIVE 2. *Assist special student groups to successfully achieve in a secondary vocational program.*

2-a. _____percent of the persons identified as special education students will be enrolled in the vocational program (mainstream).

2-b. _____percent of the disadvantaged students will be enrolled in the vocational program.

2-c. _____disadvantaged persons (economically and/or educationally) will complete the secondary vocational program.

2-d. _____disadvantaged students (economically and/or educationally) will participate in work-study programs.

2-e. _____handicapped persons (physical and/or mental) will successfully complete the secondary vocational program.

2-f. _____exceptional youths will complete the secondary vocational program.

APPENDIX A, continued

2-g. _____percent of the students enrolled will represent the sex minority in those programs traditionally considered sex-stereotyped.

2-h. _____percent of the students classified in special student groups who can benefit from a related or enabling skills course will be enrolled in such courses.

2-i. _____percent of the students enrolled in related or enabling skills courses will attain minimum competencies in order to benefit from vocational or preparatory programs.

2-j. _____percent of the students classified in special student groups will rate their vocational program as satisfactorily meeting their educational goals.

2-k. _____percent of the special student group completions will indicate they would recommend their vocational program to other students.

OBJECTIVE 3. *Provide vocational education for secondary school youth in accordance with their occupational preparation.*

3-a. _____percent of the students available for and having sought employment will be employed full-time in less than fifteen weeks after graduation. (Consider military and apprenticeships as employed.)

3-b. _____percent of the graduates available for and having sought employment in their specialization will be employed in their specialization in less than fifteen weeks after graduation. (Include military and apprenticeships if in the area of specialization.)

3-c. _____percent of the graduates available for employment will be employed in their specialization or in a position they considered related to their area in less than fifteen weeks after graduation. (Include military and apprenticeships in specialization or related area.)

3-d. _____percent of the enrollees who terminate schooling before completing program requirements will find their first full-time job in the occupation for which they were being trained or a related area. (Include military and apprenticeships if in specialization or related area.)

APPENDIX A, continued

3-e. _____percent of the graduates of any licensed occupation program who apply for and take the exam will pass.

3-f. _____percent of the students responding on a follow-up study will indicate they are satisfied with their job.

3-g. _____percent of the students employed six (6) months after graduation will indicate that their skill preparation was adequate for their present job.

3-h. _____percent of the graduates will indicate they were adequately prepared to work with supervisors, co-workers and subordinates.

OBJECTIVE 4. *Provide leadership development activities for students enrolled in vocational programs through a youth organization functioning as an integral part of the vocational instruction.*

4-a. _____percent of the students enrolled in the vocational program will have taken an active part in youth organization (i.e., VICA, FFA, FHA, etc.) activities for the school year.

4-b. _____percent of youth organization participants will rate the activities as meeting their needs and interests.

OBJECTIVE 5. *Provide guidance and counseling services (career development) information appropriate to continued education or employment for students enrolled in vocational programs.*

5-a. _____vocational students will receive career counseling and guidance services.

5-b. _____students will receive career development information during the school year 19__ - 19__.

5-c. _____percent of the students will rate career guidance and counseling services as adequate after completion of their vocational program.

5-d. _____percent of the students receiving exploratory career information will rate the experience as having influenced their career choice.

APPENDIX A, continued

OBJECTIVE 6. *Provide vocational programs to fulfill the requirement of the labor markets and the employment community's manpower needs.*

6-a. _____percent of the student completions will be working in the employment community serviced by the school corporation.

6-b. _____percent of the student completions will seek employment external to the employment community in which they were trained.

6-c. _____percent of all vocational students will be enrolled in the vocational program which corresponds to the highest employment community and manpower occupational needs. (Projected)

6-d. _____employers will value the vocational program as a source of trained manpower.

6-e. _____employers will indicate that the employees' vocational preparation was critical in the employment decision.

6-f. _____employers will rank the employees' skill and knowledge level at a minimum of fairly skilled or above.

6-g. _____employers will indicate job advancement is related to training received in the vocational education programs.

6-h. _____employers will rate the employees' on-the-job maturity factors at a minimum mean of good or above.

OBJECTIVE 7. *Encourage vocational graduates to continue their education after completion of their secondary program.*

7-a. _____percent of the students who complete the vocational program will enroll in advanced study programs.

7-b. _____percent of the students enrolled in advanced study programs will be in the same program specialty as their secondary vocational program.

7-c. _____percent of the students enrolled in advanced study programs will be in their specialization or in programs which they consider related to their secondary vocational programs.

7-d. _____percent of the students enrolled in advanced study programs will consider their secondary vocational program to have been instrumental in their decision to continue their education.

7-e. _____percent of the students enrolled in advanced study programs will indicate their vocational program prepared them for their pursuit of advanced study.

## Appendix B

LIST OF THE PARTICIPANTS IN THE STATEWIDE CONFERENCE

| Name | Position | Office |
|---|---|---|
| Joseph J. Babas | Coordinator of Apprentice Training | School City of East Chicago<br>East Chicago, IN |
| Nick Banos, Jr. | Assistant Director | Blue River Vocational Center<br>Shelbyville, IN |
| Michael Brici | Director of Vocational Education | Division of Vocational Education<br>Department of Public Instruction<br>Indianapolis, IN |
| James Broadbent | Director of Vocational and Continuing Education | Elkhart Community School Corporation<br>Elkhart, IN |
| Fred W. Burt | Administrative Assistant to Superintendent | Muncie Community Schools<br>Muncie, IN |
| James G. Coppock | Superintendent | Fort Wayne Community Schools,<br>Regional Vocational Center<br>Fort Wayne, IN |
| Melanie K. Devitt | Chief Consultant, Distributive Education | Division of Vocational Education<br>Department of Public Instruction<br>Indianapolis, IN |
| Lorraine Ewing | Vocational Coordinator | Metropolitan School District of Wayne Township<br>Indianapolis, IN |
| Charles E. Fields | Assistant Superintendent | New Albany - Floyd County School Corporation<br>New Albany, IN |
| Donald Goezeff | Assistant Director | New Castle Area Vocational School<br>New Castle, IN |
| Don A. Grostefon | Vocational Director | El-Tip-Wa Area Vocational School<br>Logansport, IN |

APPENDIX B, continued

| Name | Position | Office |
|---|---|---|
| Beverly Hankenhoff | Vocational Director | New Castle Area Vocational School<br>New Castle, IN |
| Newton Hatfield | Vocational Director | Greater Clark County Schools<br>Jeffersonville, IN |
| James E. Hixson | Vocational Director | Central Nine Vocational-Technical School<br>Greenwood, IN |
| Delmar Johnson | Vocational Director | C.A. Prosser Vocational Center<br>New Albany, IN |
| Gerald V. Kirby | Vocational Director | Southeastern Indiana Vocational School<br>Versailles, IN |
| Jack Longshore | Supervisor - Vocational Education | Indianapolis Public Schools<br>Indianapolis, IN |
| Roderick A. McKinney | Director, Vocational and Adult Education | Benton Community Schools<br>Fowler, IN |
| David E. Middleton | Principal/Director | Anderson Community Schools<br>Anderson, IN |
| Ina Moseley | Chairman, Department of Business Education | Bartholomew Community School Corporation<br>Columbus, IN |
| Philip E. Myers | Consultant, Distributive Education | Division of Vocational Education<br>Department of Public Instruction<br>Indianapolis, IN |
| John E. Newkirk | Treasurer, Board of Education | Metropolitan School District of Lawrence Township<br>Indianapolis, IN |
| Howard Noble | Vocational Director | Metropolitan School District of Lawrence Township<br>Indianapolis, IN |

APPENDIX B, continued

| Name | Position | Office |
|---|---|---|
| Don Pennington | Vocational Director | Metropolitan School District of Washington Township Indianapolis, IN |
| Mary Jenet Penrod | State Coordinator of Supportive Services and Program Improvement | State Board of Vocational and Technical Education Indianapolis, IN |
| Shirley Smalley | Health Occupations Coordinator | New Castle Area Vocational School New Castle, IN |
| James L. Thompson | Vocational Director | Area Vocational District 19 Lafayette, IN |
| Meredith L. Thompson | Coordinator, Practical Arts and Vocational Education | Bartholomew Community School Corporation Columbus, IN |
| Tony Wesolowski | Area Vocational Director | Four County Area Vocational Corporation Garrett, IN |
| Dick Wysong | Vocational Director | Wawasee High School Syracuse, IN |

# Appendix C

CONFERENCE EVALUATION FORM

1. Please check the extent to which you were satisfied with the following aspects of cost-effectiveness techniques and the conference operation.

| | Very Satisfied | Partially Satisfied | Dissatisfied |
|---|---|---|---|
| 1.1 The understanding I achieved of how to determine program objectives and target goals. | _____ | _____ | _____ |
| 1.2 The understanding I achieved of how to analyze program costs. | _____ | _____ | _____ |
| 1.3 The understanding I achieved of how to measure program effectiveness, cost efficiency, and performance ratio. | _____ | _____ | _____ |
| 1.4 The understanding I achieved of how to interpret and use cost-effectiveness analysis results. | _____ | _____ | _____ |
| 1.5 The opportunity we had for discussion, especially in group work. | _____ | _____ | _____ |
| 1.6 The usefulness of materials received during the conference. | _____ | _____ | _____ |
| 1.7 The opportunity for my professional development. | _____ | _____ | _____ |
| 1.8 The organization and operation of the conference. | _____ | _____ | _____ |
| 1.9 The conference location and facilities. | _____ | _____ | _____ |

APPENDIX C, continued

2. Please circle the number in the right-hand column which best indicates the degree of your agreement or disagreement with each of the following statements concerning cost-effectiveness analysis in general and the cost-effectiveness analysis system which was introduced during the conference.

| | | Strongly Disagree | | | | Strongly Agree |
|---|---|---|---|---|---|---|
| 2.1 | I am familiar with the cost-effectiveness analysis concept . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.2 | Cost-effectiveness analysis is relevant to the situations faced by my school (or corporation) . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.3 | Vocational educators need more knowledge of the cost-effectiveness concept . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.4 | I am personally interested in the concept of cost-effectiveness analysis . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.5 | A set of instruments and data forms would be advantageous to my school (or corporation) for analyzing the cost-effectiveness of vocational education programs . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.6 | Cost-effectiveness analysis is needed in vocational education in general . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.7 | I am willing to recommend the use of the cost-effectiveness analysis system to others . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.8 | The cost-effectiveness analysis system would enable my school to improve its management system . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.9 | The cost-effectiveness analysis system is valuable in planning and evaluating vocational programs . . . . . | 1 | 2 | 3 | 4 | 5 |

APPENDIX C, continued

| | | Strongly Disagree | | | | Strongly Agree |
|---|---|---|---|---|---|---|
| 2.10 | I am willing to adopt the cost-effectiveness analysis system for my use . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.11 | It is important to the vocational education of my school that the cost-effectiveness system be adopted . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.12 | The adoption of cost-effectiveness analysis is beneficial to vocational education . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.13 | The cost-effectiveness analysis system is consistent with the existing values, past experience, and needs of my school system . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.14 | The cost-effectiveness analysis system is difficult to understand and use . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.15 | The cost-effectiveness analysis system can be implemented on a limited basis . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2.16 | The resulting cost-effectiveness measures are easily observed and communicated to others . . . . . | 1 | 2 | 3 | 4 | 5 |

What kinds of problems do you expect to meet if you choose to adopt the cost-effectiveness analysis system? Please describe your recommendations for overcoming these problems:

_____

_____

_____

_____

_____

THANK YOU